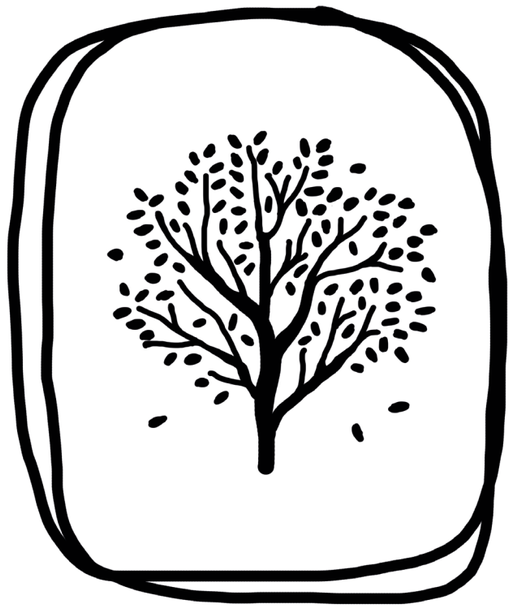


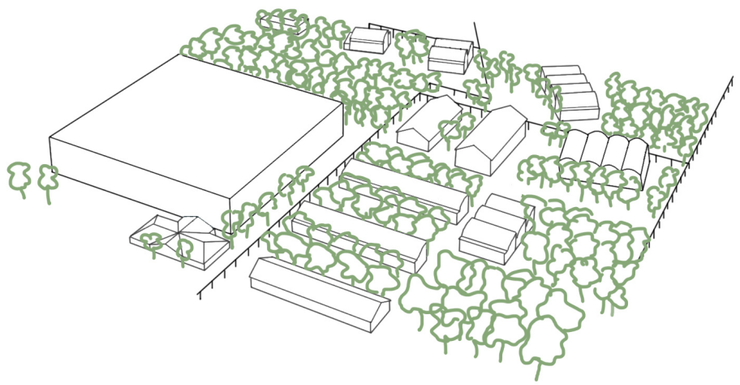
HARVEST

A BURN-OUT RETREAT

DESIGN

HEMBRUG - PLOTS IN THE WOODS - P4 - VALERIE ARNTZ - 4160576

INTRODUCTION: CHALLENGES AND OPPORTUNITIES

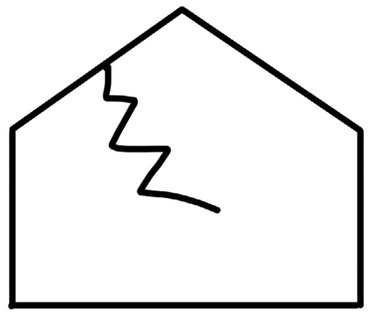


THE ‘PLOTS IN THE WOODS’ IS VACANT

REVITALISE THE ‘PLOTS IN THE WOODS’

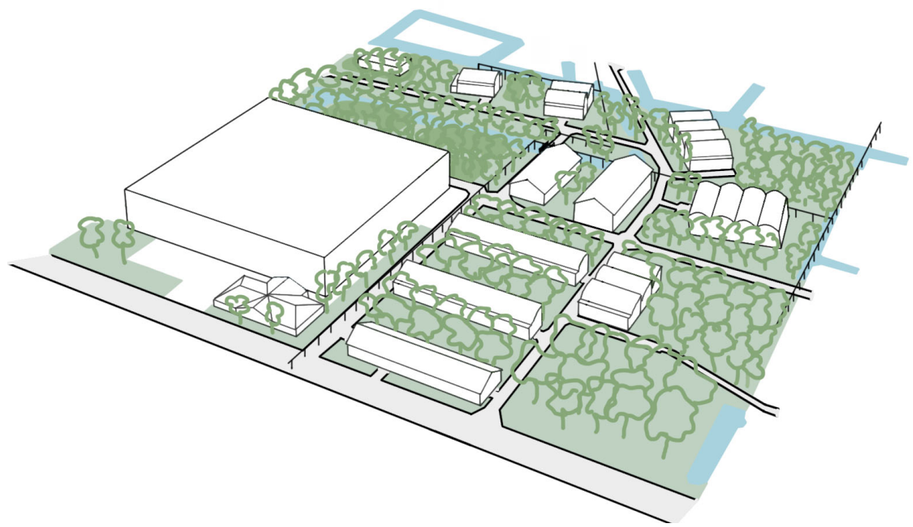
MORE AND MORE PEOPLE ARE GETTING A BURN-OUT

HELP PEOPLE WITH A BURN-OUT TO FEEL PHYSICALLY AND MENTALLY GOOD AGAIN



THE BUILDINGS ARE UNSUSTAINABLE

TRANSFORM INTO SUSTAINABLE BUILDINGS



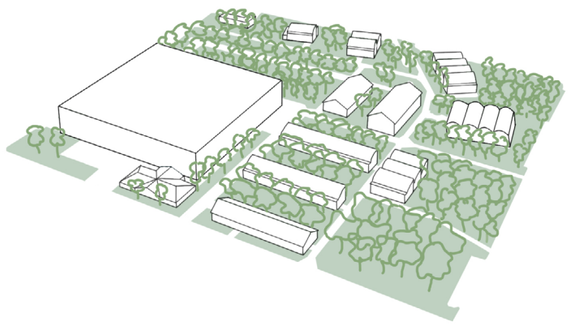
HARVEST

A BURN-OUT RETREAT

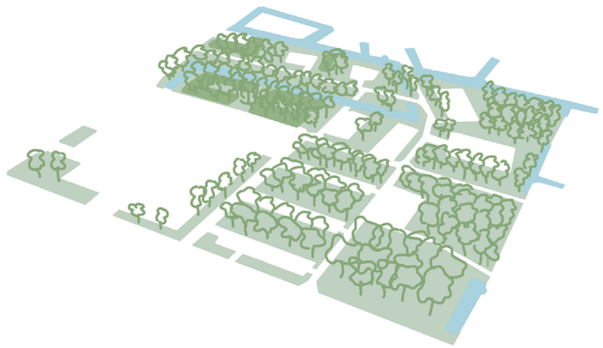
REVITALISE THE 'PLOTS IN THE WOODS'
INTO A BURN-OUT RETREAT WITH A FOCUS
ON THE **WELLBEING OF THE VISITORS AND**
SUSTAINABILITY WHILE MAINTAINING
THE CHARACTERISTIC VALUES

HOW DOES THE **FUNCTIONAL DESIGN APPROACH** PRACTICED BY THE 'ARTILLERIE-INRICHTINGEN' **MANIFEST ITSELF** IN THE 'PLOTS IN THE WOODS'?

ENSEMBLE CHARACTERISTIC VALUES

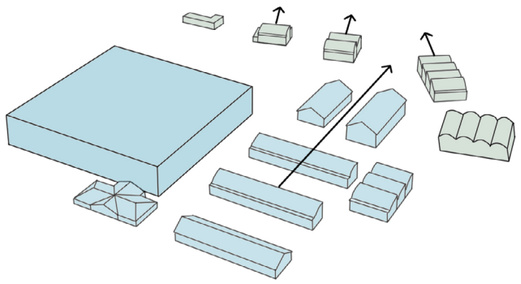


SMALL SEPARATE BUILDINGS
IN THE FOREST

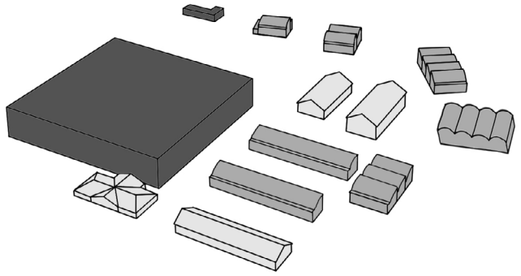


FUNCTIONAL LANDSCAPE

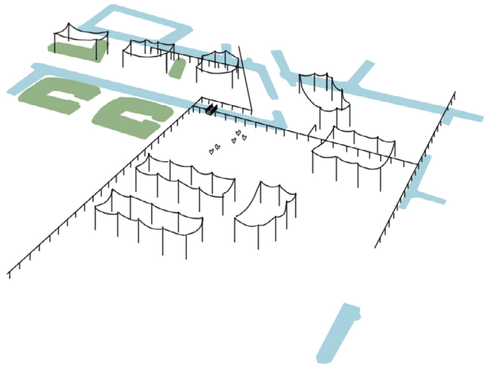
PRECISE VS BEWILDERED



SET-UP AND DIRECTION

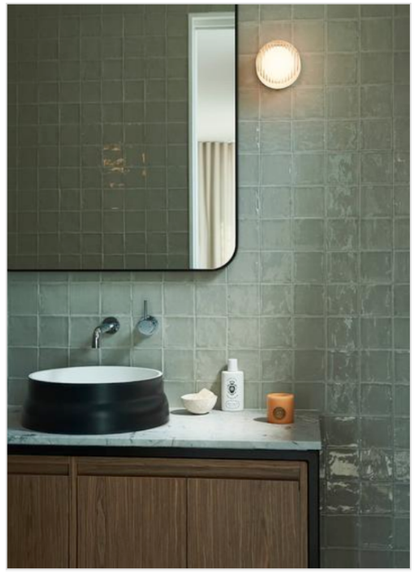


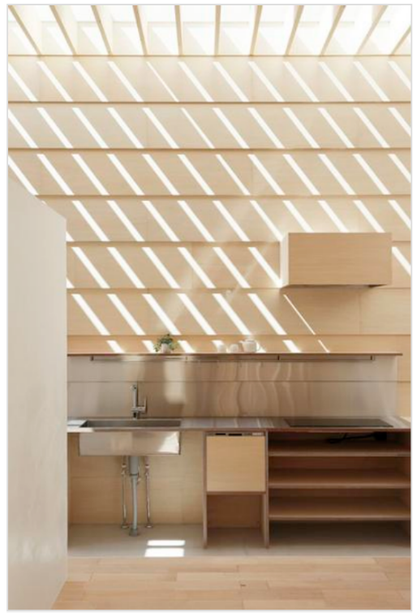
TYPOLOGIES SHOW FUNCTIONS

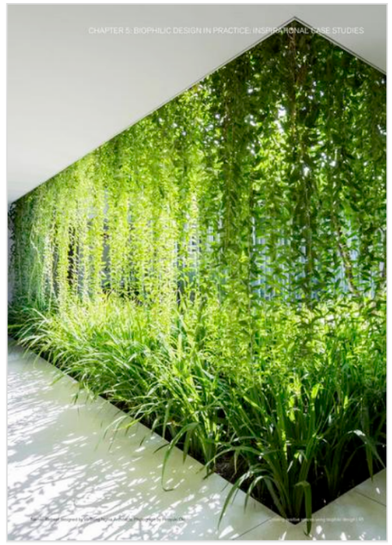


TRACES OF THE PAST
ARE STILL PRESENT

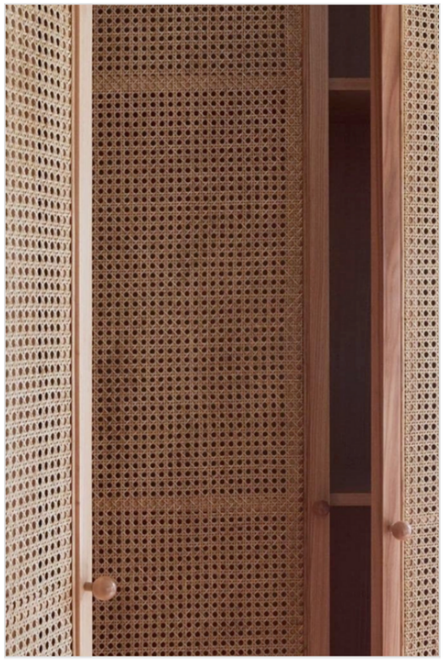
PROGRAM BIOPHILIC DESIGN

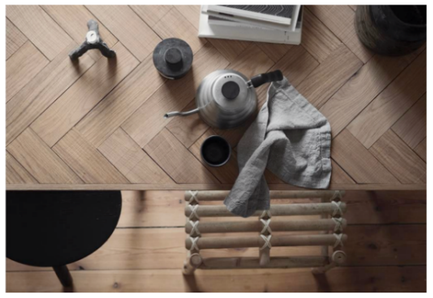






TECHNIQUE MATERIALS





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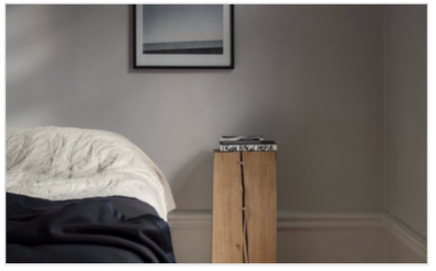


Biophilic design implementations

Biophilic design is an approach to architecture that seeks to connect building occupants more closely to nature. Onze connectie met de natuur lijkt volledig verdwenen, we zijn 90% van de tijd binnen. Stress, agressie en depressiviteit worden hierdoor verergerd. Biophilic design kan bijdragen aan de verbetering van de productiviteit en reduceren van stress en zelfs pijn. Biofilie betekent letterlijk de voorliefde voor de natuur en het leven. Het is de onlosmakende band tussen mens en natuur. Biophilic design gebruikt aspecten uit de natuur om de band tussen mens en natuur te herstellen. Door bewust natuurlijke elementen te gebruiken of te imiteren in het interieurontwerp, maken we onbewust opnieuw verbinding met de natuur. Het verbetert de mate van hoe gelukkig, creatief en productief we zijn.

Nature in the space.
Hier gaat het om het imiteren van natuurlijke aspecten.

1. Visual connection with nature
   Seeing the green outdoors, flowers and plants, green roof, landscaped gardens with seating areas, light well atrium. Natural flow of water, vegetation incl food bearing plants, soil/earth.

2. Non-visual connection with nature
   Furniture materials use soft/contrasting materials, stone, wood, fur. Different kind of spaces. Healthy food. Operable windows. Zoning: floor textures - carpet/timber/stone/biometric. Nature sounds. Fragrant herbs and flowers, Weather (rain, wind, hail), Natural ventilation (operable windows, breezeways), Horticulture/gardening, including edible plants.

3. Non-Rhythmic sensory stimuli
   Opening windows to allow breezes to create gentle movement in plant leaves, blinds or curtains. Blinds with cut outs to project shadows and light. Kinetic artwork: mobiles. Handmade/glazed reflective tiles. Lights in trees. Create rippling movements, light reflecting off water.
   Cloud movement, Plant life rustling, Water babbling, Billowy fabric or screen materials that move or glisten with light or breezes.

4. Thermal & Airflow variability
   Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments. Enable opening and closing of windows throughout the day according to comfort levels. Being able to change the temperature or be able to pick a favourite spot. Feeling the windflow. Clay paints and surfaces: absorb heat/moisture imbalance. Covered outdoor spaces: eating areas, canopy in winter, covered outdoor exercise spaces. Space/place orientation. HVAC delivery strategy, cross ventilation.

5. Presence of water
   Face water. Full height glass walls / windows to see water flow down - rain or water feature. Showers, pools, steam rooms, waterfalls, bath in the bedroom. Fountains. Soundscaping waterfall from Plantronics. River, stream, ocean, pond, wetland. Visual access to rainfall and flows

6. Dynamic and diffuse light
   Varying intensities of light and shadow that change over time to create conditions that occur in nature. Daylight from multiple angles: position close to windows/skylights. Diurnal and seasonal light. Adjustable blinds to control light. Circadian lighting. Sheltered space outside. Planting to create shadows (deciduous windows). Materials: light reflecting floors, tables, walls and surfaces, mirrors, light reflective paint, tile glazes, white surfaces. Glass doors / walls / roof / skylight. Task and personal lighting.

7. Connection with natural systems.
   The awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem. Emphasising/awareness of the changing seasons and temperature. Climate and weather patterns (rain, hail, snow; wind, clouds, fog; thunder, lightning). Position furniture to enable views of sky/weather outside. Night sky. Rain catchers, wind chimes, rainbow maker (prism). Inside/outside. Hydrology (precipitation, surface water flows and resources; flooding, drought; seasonal arroyos)

Natural Analogues.
Hier worden de kleinere details van de natuur nagebootst met behulp van textiel, kunst, verlichting, vormen of patronen.

8. Biomorphic forms & patterns
   Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature. Organic shaped furniture. Patterns within patterns, repeated forms at different scales. Spirals, cell like facades. Layout of interior/exterior spaces: curved paths and zones. Freedom to be experimental: pavilions, installations, structures. Fabrics, carpet, wallpaper designs based on Fibonacci series or Golden Mean. Window details: trim and mouldings, glass color, texture, mullion design, window reveal detail. Installations. Furniture details. Woodwork, masonry. Wall decal, paint style or texture. Acoustic paneling. Pathway and hallway form. Railings, banisters, fencing, gates.

9. Material connection with nature
   Good Material Connection with Nature feels rich, warm and authentic, and sometimes stimulating to the touch. Natural colours, textures and patterns. Use of nature inspired colours, ecological valence theory. Timber, clay/ceramics, bark tiles, cork, leather, wood, stone, wood handles, timber wall panels, veneer, wallpaper that mimics natural material surface. Display objects occupants have found in local natural environments, stones, shells, seedpods, branches. Biomimetic tiles, wallpaper, flooring. Accent details (natural wood grains; leather; stone, fossil textures; bamboo, rattan, dried grasses). Interior surfaces (veneer, countertops). Woodwork, stonework. Natural color palette, particularly greens. Wall construction (wood, stone). Structural systems (heavy timber beams).

10. Complexity and order
    Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature. Organise spaces into zones. Symmetry. Using patterns, textures, light, sound, colours and touch. Partitions with glass textures, light, sound, colour and touch. Exposed structure and mechanical systems (exoskeletal). Wallpaper and carpet design. Material texture and contour. Plant selection variety and placement. Exposed structure/exoskeleton and exposed mechanical systems. Pedestrian and traffic flows.

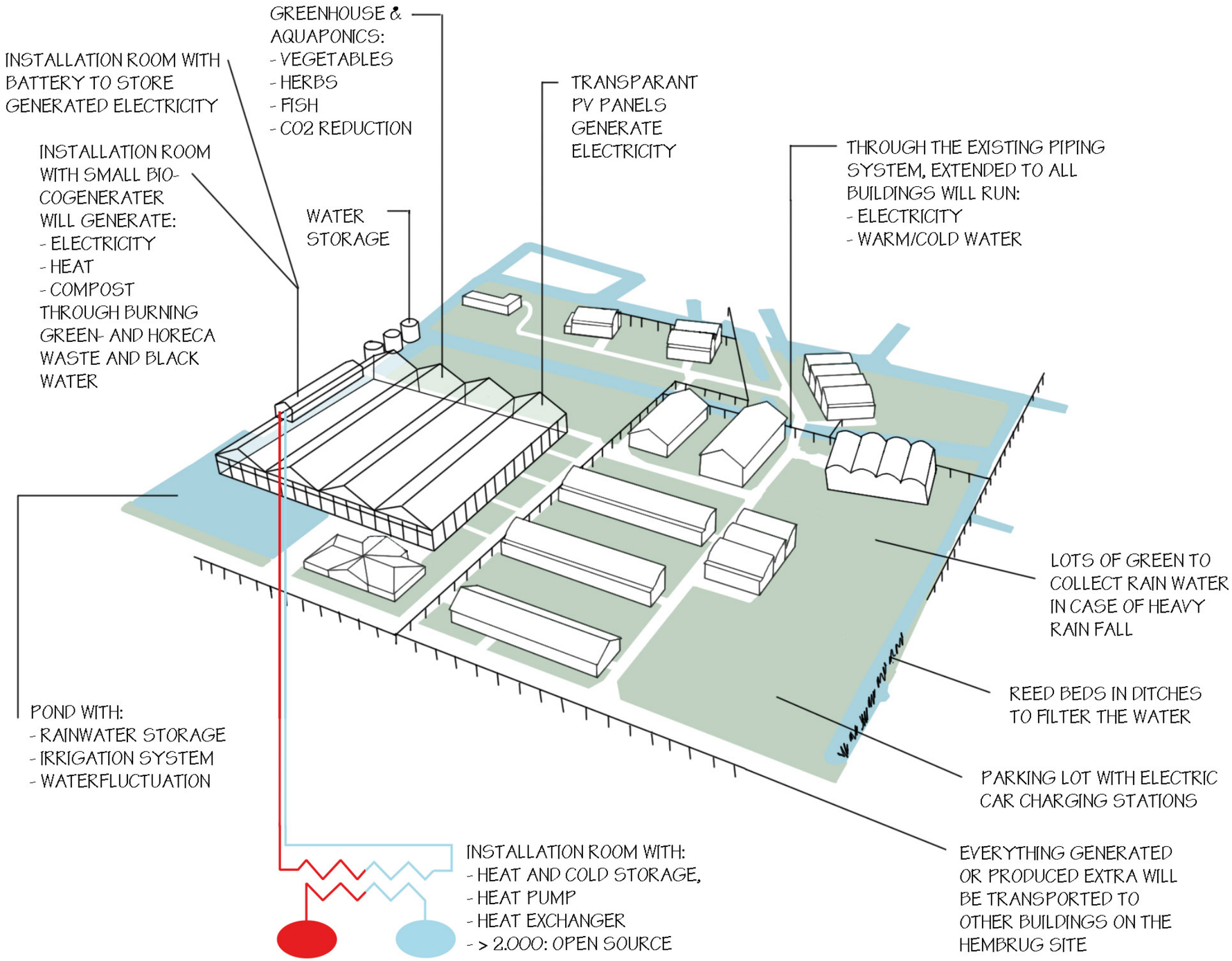
Nature of the space.
Het gevoel van ruimte wordt beschreven, zoals beschutting, weidse uitzichten en avontuurlijke gebieden.

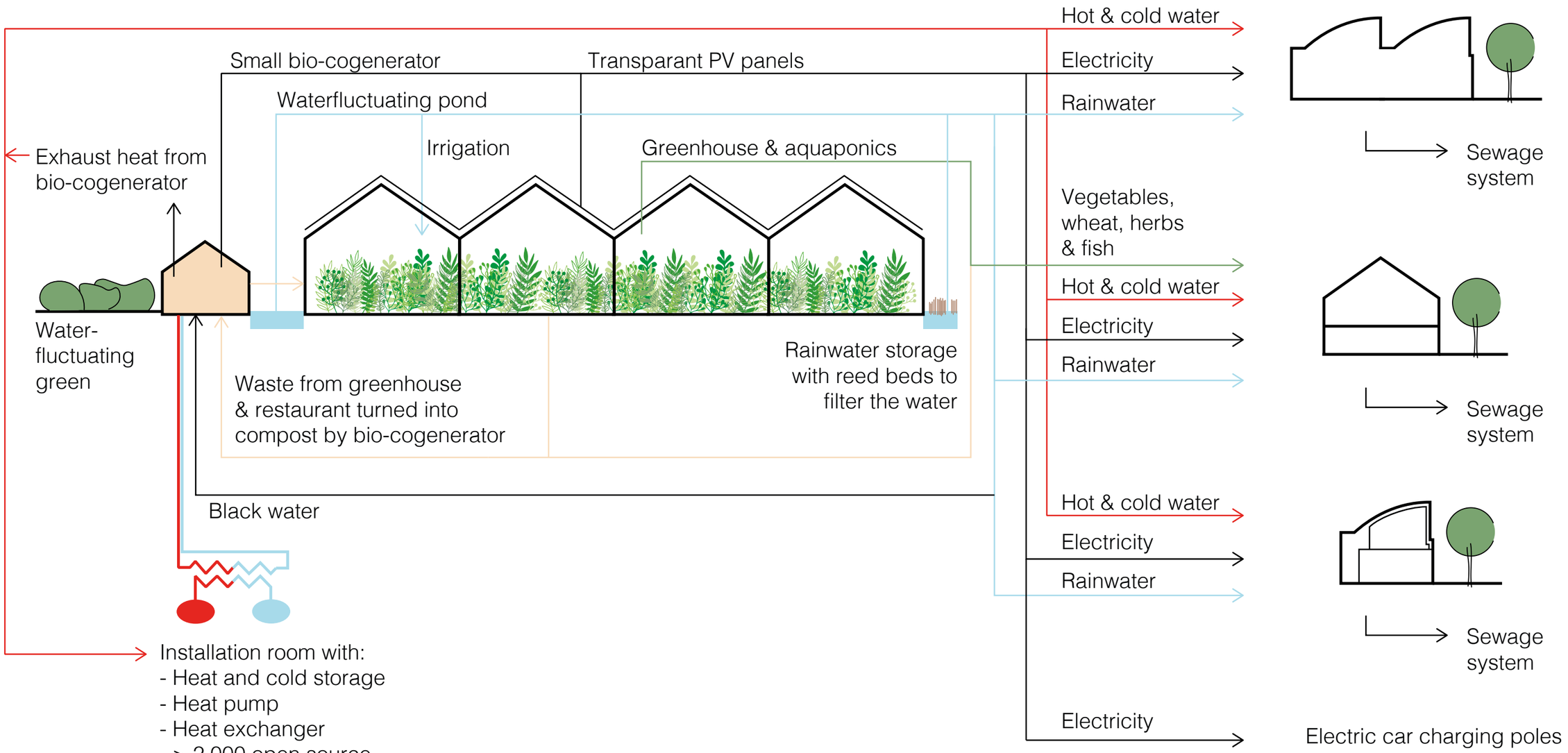
11. Prospect (Perspective).
    Feels open and freeing, yet imparts a sense of safety and control, particularly when alone or in unfamiliar environments. Positioning by windows. Building in nature, way-finding through structure, balconies - sense of space, mezzanine, elevated platforms (interior and exterior), transparant materials: glass, polycarbonate, walls, doors, partitions, seating (low back) tiered communal seating. Being able to look further. Balconies, catwalks, staircase landings. Open floor plans. Views including shade trees, bodies of water or evidence of human habitation.

12. Refuge
    A place for withdrawal, from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead. Create private spaces for retreating & restoring energy. Pavilion arcades & walkways, indoor winter garden, outdoor mezzanine, raised platforms, outdoor seating benches, curtains/partitioning, set up quiet corners (seat, lamp, carpet), refuge pods. Lounges where you can withdraw but don't lose visual contact. Modular refuge: Small protection (high-back chair, overhead trellis), Partial refuge: Several sides covered (reading nooks, booth seating, bay window seats, canopy beds, gazebos, canopy trees, arcades, covered walkways or porches), Extensive refuge: near or complete concealment (reading/telephone/ sleeping pods, meeting rooms with 3+ walls, private offices, tree houses). Spaces reserved for reflection, meditation, rest, relaxation, reading, or complex cognitive tasks. Operable, adjustable or translucent (or semi-opaque) shades, blinds, screens or partitions.

13. Mystery
    Has a palpable sense of anticipation, or of being teased, offering the senses a kind of denial and reward that compels one to further investigate the space. Winding paths through spaces, gentle curving (slightly disorientating), labyrinths, a pull towards a space: sounds, smells, light, wonder. Obscured views: plants hanging, glass, partitions, frosted glass. Screen/curtain creates shadow movement and implied activity that you want to see. Mirrors - disorientate, leafy/planted screens. Reveal and discover. Sudden vistas. Curving edges. Winding paths. Light and shadow. Activity or movement. Artwork or installation. Form and flow. Translucent materials.

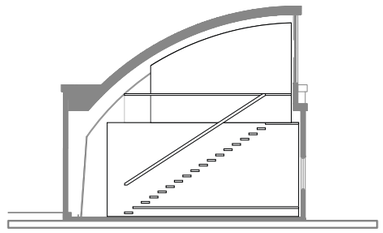
14. Risk/peril
    An identifiable threat coupled with a reliable safeguard. Create a supportive culture that encourages everyone to step outside their comfort zone e.g. learning new skills. Hammocks, hanging chairs/swing seats, hanging shelves, seating over drops, uneven flooring, glass escalator / floor / railing: height / height differences (walkway, double height atriums, tree houses, gazebos), hanging walkways, bouldering walls. Stepping stones in the water. Transparent railing or floor plane


GREENHOUSE & AQUAPONICS:
- VEGETABLES
- HERBS
- FISH
- CO2 REDUCTION
INSTALLATION ROOM WITH BATTERY TO STORE GENERATED ELECTRICITY
INSTALLATION ROOM WITH SMALL BIO-COGENERATER WILL GENERATE:
- ELECTRICITY
- HEAT
- COMPOST
THROUGH BURNING GREEN- AND HORECA WASTE AND BLACK WATER
WATER STORAGE
TRANSPARANT PV PANELS GENERATE ELECTRICITY
THROUGH THE EXISTING PIPING SYSTEM, EXTENDED TO ALL BUILDINGS WILL RUN:
- ELECTRICITY
- WARM/COLD WATER
LOTS OF GREEN TO COLLECT RAIN WATER IN CASE OF HEAVY RAIN FALL
REED BEDS IN DITCHES TO FILTER THE WATER
PARKING LOT WITH ELECTRIC CAR CHARGING STATIONS
EVERYTHING GENERATED OR PRODUCED EXTRA WILL BE TRANSPORTED TO OTHER BUILDINGS ON THE HEMBRUG SITE
POND WITH:
- RAINWATER STORAGE
- IRRIGATION SYSTEM
- WATERFLUCTUATION
INSTALLATION ROOM WITH:
- HEAT AND COLD STORAGE,
- HEAT PUMP
- HEAT EXCHANGER
- > 2.000: OPEN SOURCE

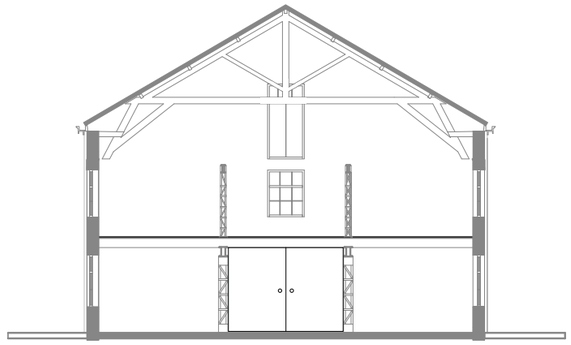


Everything generated or produced extra will be transported to other buildings on the Hembrug site

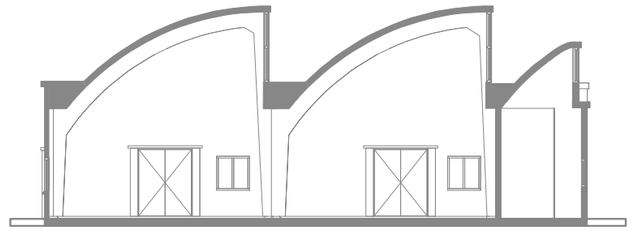
DESIGN: HERITAGE POSITION



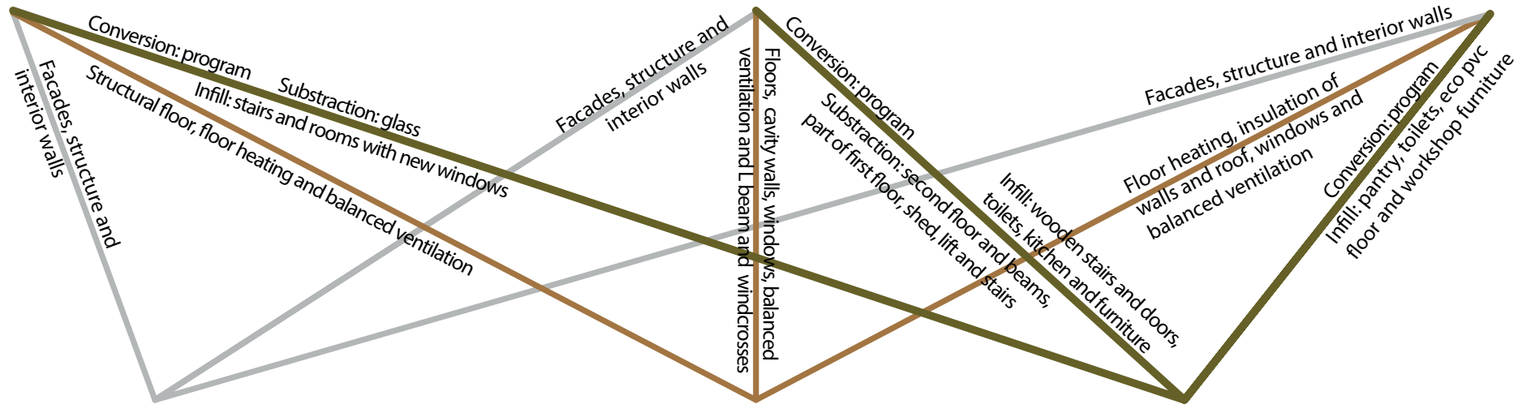
DE ASSEMBLAGE



HET MAGAZIJN



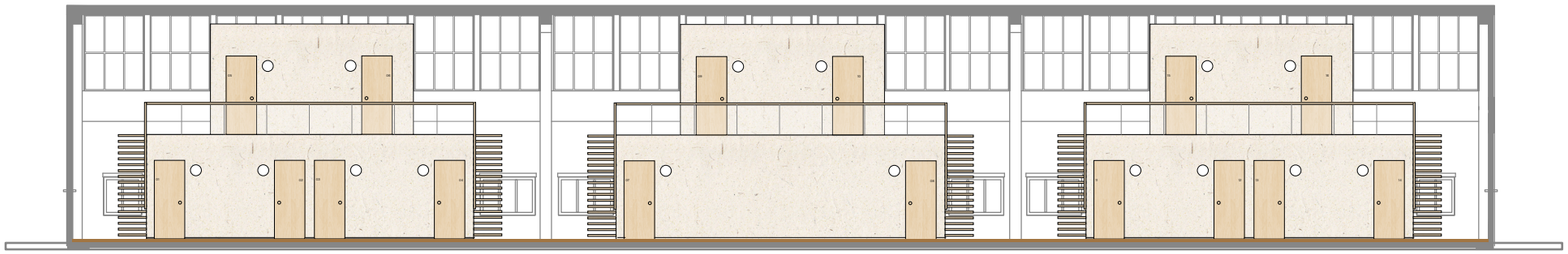
DE PERSERIJ

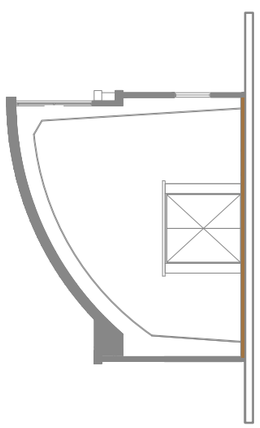


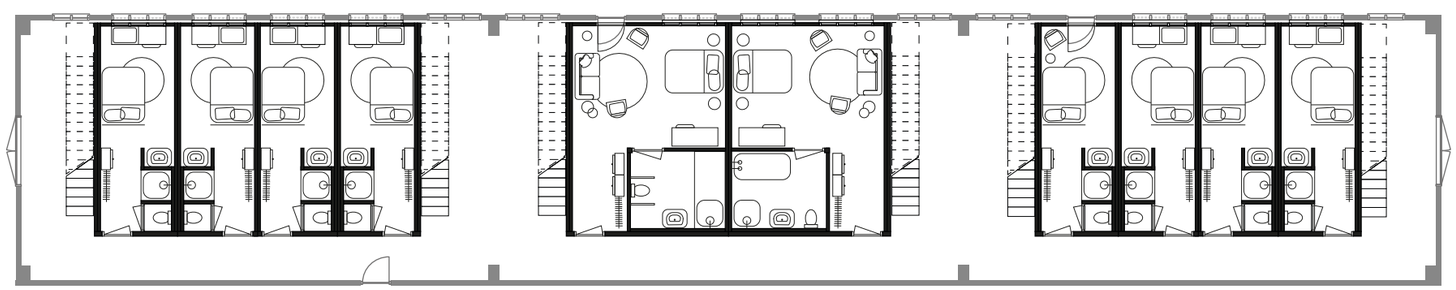
PRESERVATION	RESTORATION	RENOVATION	INTERVENTION	REDESIGN
Maintenance.	Only absolutely necessary parts are replaced identical to original. Cleaning.	Upgrading to conform to technical and functional requirements, while leaving the appearance more or less unchanged.	Conversion: a different function Infill: elements placed in the building Substraction: elements removed from the building.	Develop a new concept based on the logic of the old. Often a radical renewal. Refill or addition.
REDUCE		REUSE	RECYCLE	
Repair only what is necessary.		Maintain as much as possible, if this is not possible adapt.	Reintroduce and reuse all substracted building materials for interventions.	

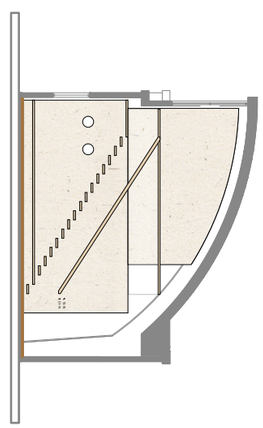
WELLBEING OF USERS / SUSTAINABILITY

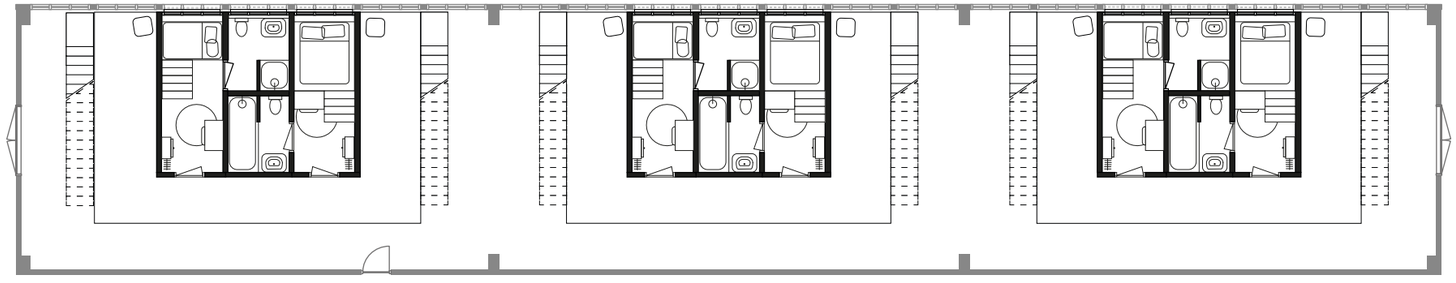
Preserve typologies, respect the use of the original materials as much as possible and upgrading to present-day conditions







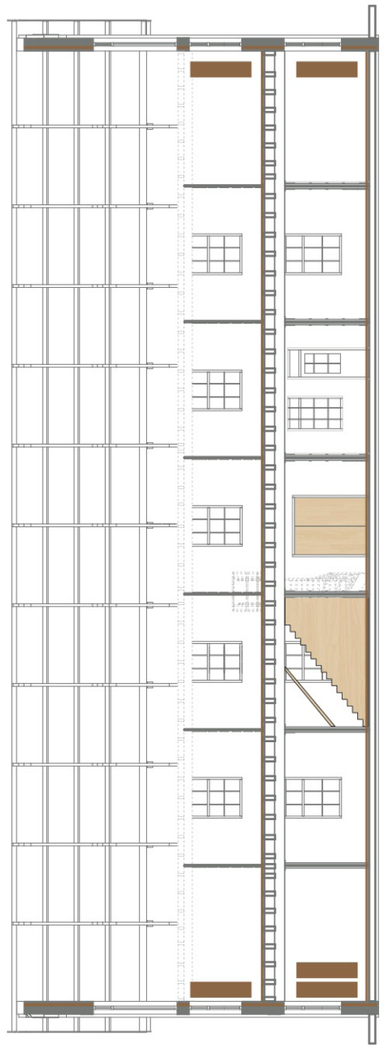


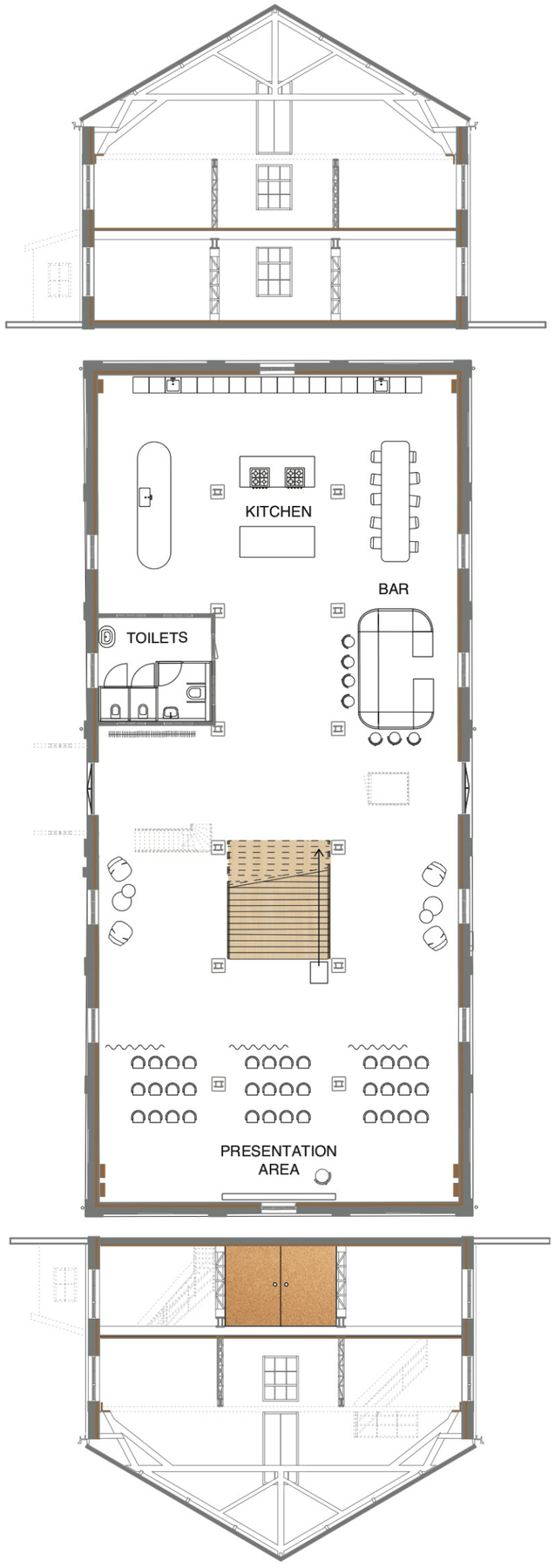


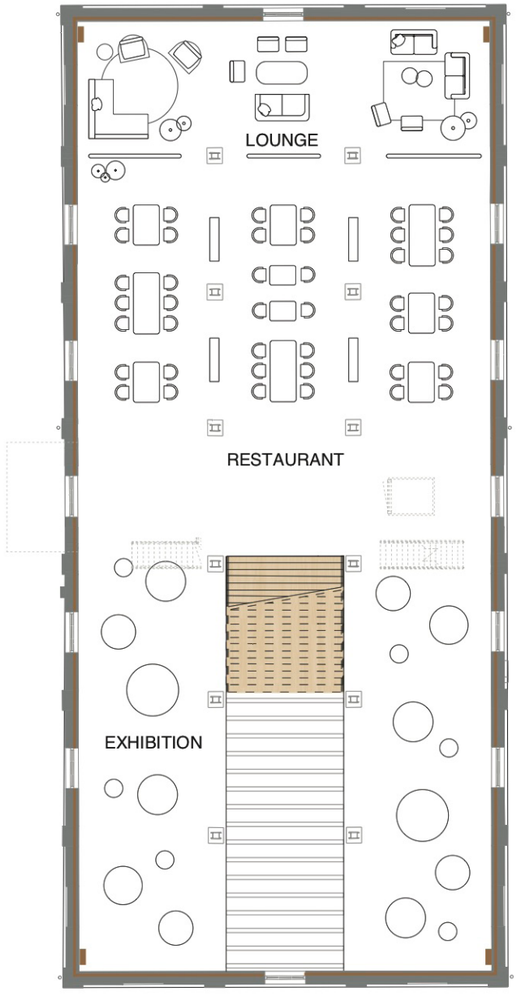
1. Preservation and restoration:
   - Facade
   - Structure
   - Interior walls
2. Renovation:
   - New structural floor and floor heating on existing floor
   - Balanced ventilation

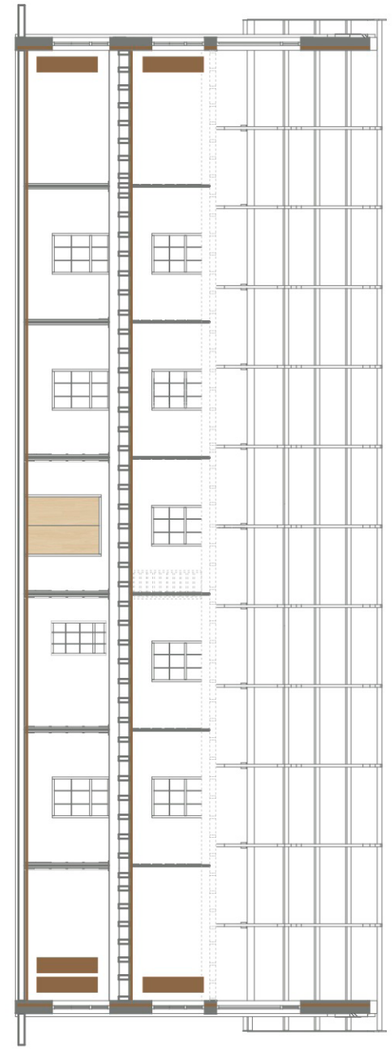
3. Intervention:
   - Substraction: part of the glass of windows
   - Conversion: program
   - Infill: wooden stairs, doors and volumes for bedrooms with new HR++ windows

1:200









1. Preservation and restoration:
   - Facade
   - Structure
   - Interior walls
2. Renovation:
   - Floor heating
   - Insulation in cavity walls
   - Monumental glass in windows
   - Decentral ventilation units
   - L beam and three windcrosses
3. Intervention:
   - Substraction: second floor and beams, part of first floor, shed, lift and stairs.
   - Conversion: program
   - Infill: wooden stairs and doors, toilets, kitchen and furniture.

Recycle substracted materials.

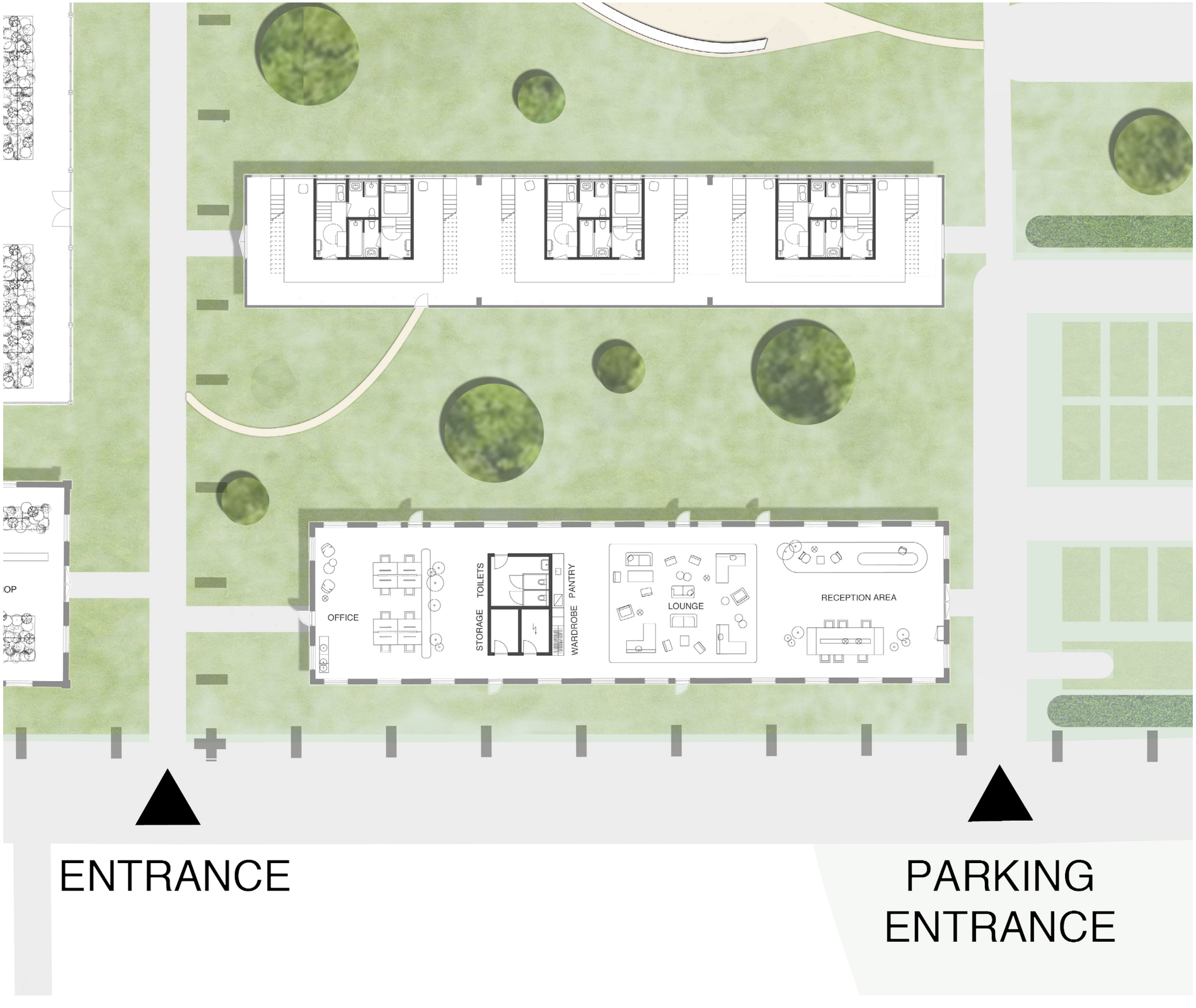
1:200

1. Preservation and restoration:
   - Facade
   - Structure
   - Interior walls
2. Renovation:
   - Floor heating
   - Insulation of walls and roof
   - Monumental glass in windows
   - Decentral ventilation units
3. Intervention:
   - Conversion: program
   - Infill: pantry, toilets, eco pvc floor and workshop furniture.

1:200

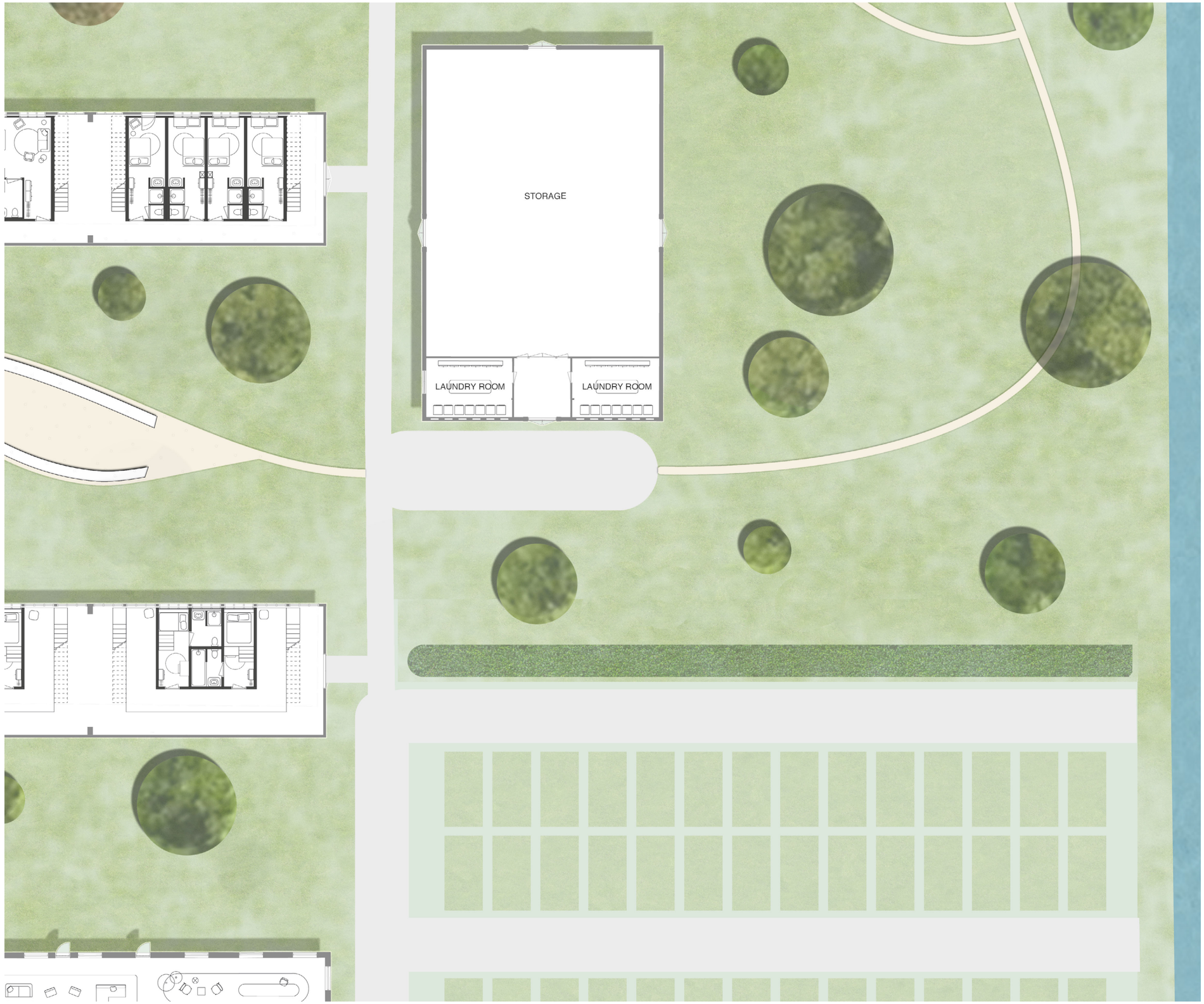
FLOORPLAN ENSEMBLE

FLOORPLAN RECEPTION



FLOORPLAN FARM SHOP. GREENHOUSE AND STORAGE & INSTALLATION BUILDING

FLOORPLAN PARKING AND STORAGE & LAUNDRY BUILDING

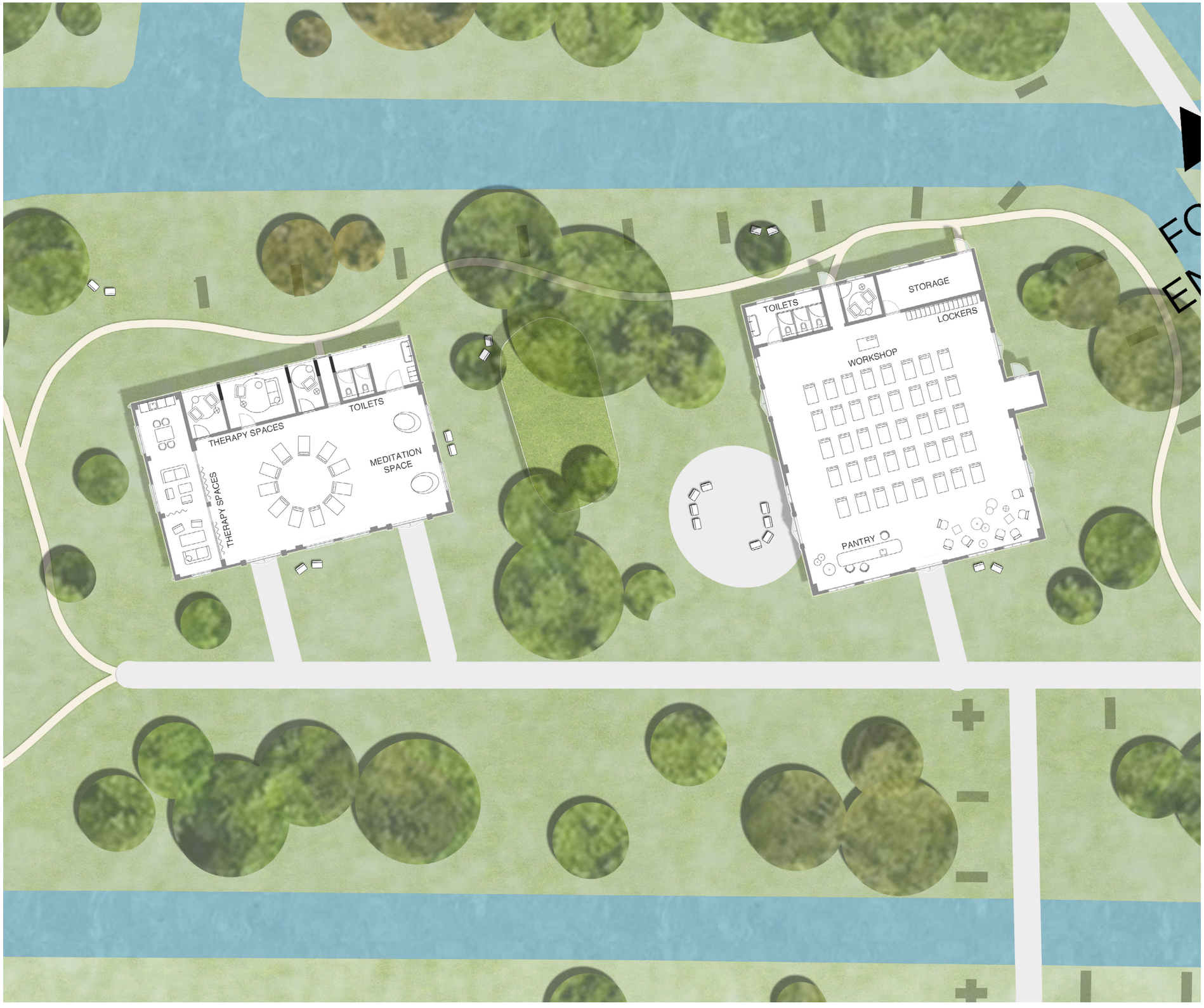


FLOORPLAN BEDROOMS GROUND FLOOR AND FIRST FLOOR

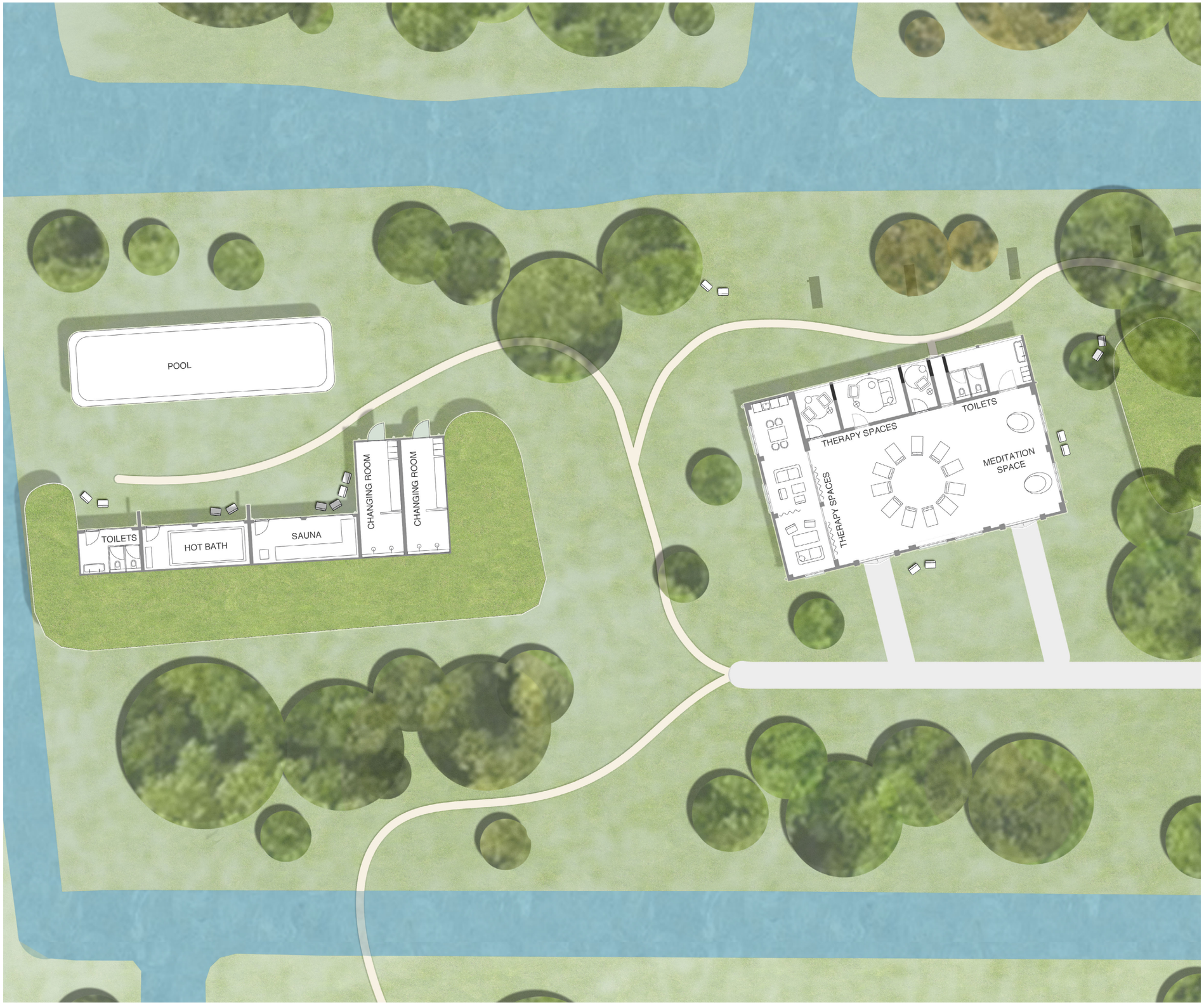

PANTRY
MUSIC
PLAY
KITCHEN
BAR
TOILETS
READ
WRITE
PRESENTATION
AREA

FLOORPLAN ACTIVE WORKSHOPS

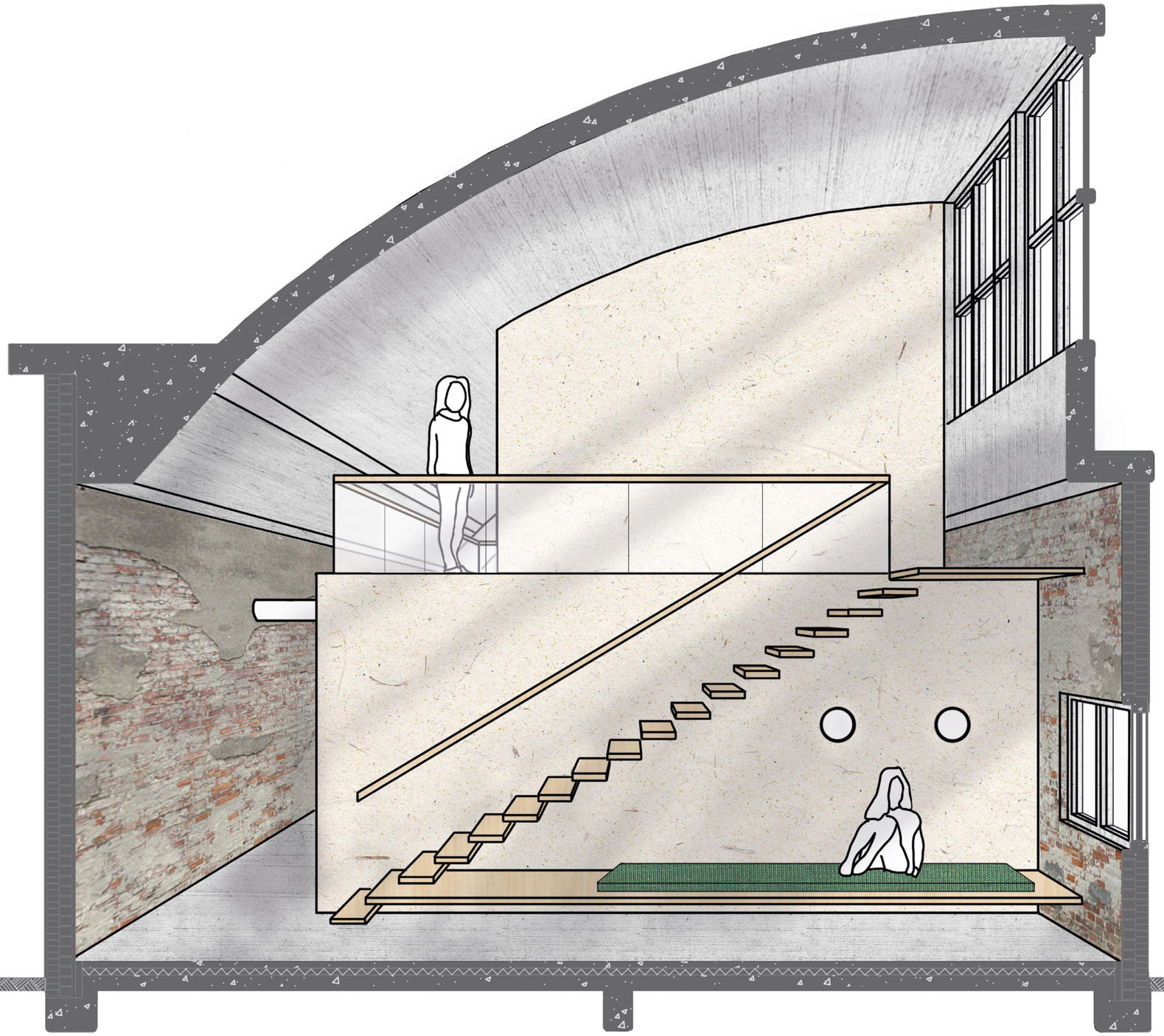
FLOORPLAN MINDFUL WORKSHOPS AND TREATMENT

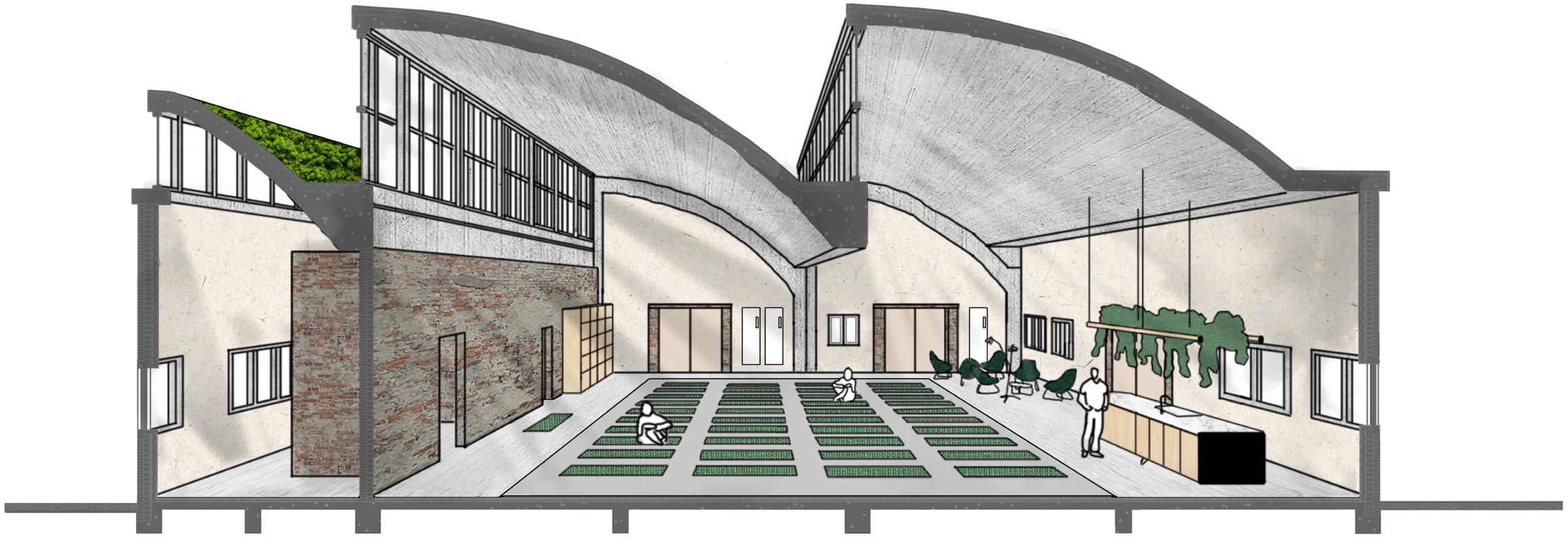


FLOORPLAN THE RELAXING AREA AND TREATMENT



FLOORPLAN THE EARTHEN WALLS AND HOGGIN PATHS





Corridor	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Concrete	185	0,05	9,25
	Ceiling	Concrete	400	0,05	20,00
	Windows side	Concrete / glass	169	0,05	8,45
	Back side	Concrete	53	0,05	2,65
	Front side	Concrete	53	0,05	2,65
	Blind side	Concrete	220	0,05	11,00
	Furniture + circulation	Wood	275	0,10	27,47
	Walls of rooms	Acoustic plaster	495	0,60	297,00
	Glass railings	Glass	57	0,05	2,85
	Seats	Kvadrat textile	24	0,60	14,40
Total Surface Area			1931		396
			Average Absorption Coefficient [-]	396/1931 = 0,20	
			Volume [m3]	2047	
			Reverberation time [s]	2047 / (6*396) = 0,86	
Conclusion: the reverberation time is below 1,0. This means it meets the requirements of for example a waiting room					

Bedrooms without furniture	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Wood	15,40	0,10	1,54
	Ceiling	Loam plaster	15,40	0,20	3,08
	Entrance side: door	Wood	2,50	0,10	0,25
	Window	Glass	1,44	0,05	0,07
	Window element	Wood	10,00	0,10	1,00
	Window side	Loam plaster	3,60	0,20	0,72
	Left side	Loam plaster	17,00	0,20	3,40
	Right side	Loam plaster	11,58	0,20	2,32
	Toilet door	Wood	2,50	0,10	0,25
	Shower door	Glass	2,50	0,05	0,13
	Bathroom element	Paint	7,00	0,05	0,35
Total Surface Area			89		13
			Average Absorption Coefficient [-]	13 / 89 = 0,15	
			Volume [m3]	34	
			Reverberation time [s]	34 / (6*13) = 0,44	
Conclusion: the reverberation time is below 0,5. This means it meets the requirements of hotel rooms.					

Yoga workshop	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Concrete	170,00	0,05	8,5
	Ceiling	Concrete	292,00	0,05	14,60
	Structure	Concrete	55,50	0,05	2,78
	Entrance side	Existing plaster	60,00	0,10	6,00
	Left side	Existing plaster	87,30	0,10	8,73
	Right side	Existing plaster	107,30	0,10	10,73
	Back side	Existing plaster	64,30	0,10	6,43
	Windows	Glass	64,80	0,05	3,24
	Doors	Painted wood	34,64	0,05	1,73
	Curtains	Kvadrat textile	63,12	0,60	37,87
	Pantry	Wood	22,88	0,10	2,29
	Lockers	Wood	10,92	0,10	1,09
	Lounge	Kvadrat textile	11,28	0,60	6,77
	Yoga mats	Eco PVC	90,00	0,40	36,00
Total Surface Area			1134		147
		Average Absorption Coefficient [-]	109 / 1071 = 0,13		
		Volume [m3]	1690		
		Reverberation time [s]	1690 / (6*147) = 1,92		
		Reverberation time [s] with 40 persons	1690 / (6*(147+20)) = 1,69		
Conclusion: the reverberation time is way too high. Replacing the complete floor for a thick carpet is for example not enough, it will lead to a reverberation time of 1,17, real acoustic measures need to be taken to get below 0,8 s.					

Yoga workshop	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Concrete	80,00	0,05	4
	Ceiling	Concrete	292,00	0,05	14,60
	Structure	Concrete	55,50	0,05	2,78
	Entrance side	Acoustic BAUX panels	60,00	0,80	48,00
	Left side	Acoustic BAUX panels	87,30	0,80	69,84
	Right side	Acoustic BAUX panels	107,30	0,80	85,84
	Back side	Existing plaster	64,30	0,10	6,43
	Windows	Glass	64,80	0,05	3,24
	Doors	Painted wood	34,64	0,05	1,73
	Curtains	Kvadrat textile	63,12	0,60	37,87
	Pantry	Wood	22,88	0,10	2,29
	Lockers	Wood	10,92	0,10	1,09
	Lounge	Kvadrat textile	11,28	0,60	6,77
	Yoga floor	Eco PVC	180,00	0,40	72,00
Total Surface Area			1134		356
		Average Absorption Coefficient [-]	356 / 1134 = 0,31		
		Volume [m3]	1690		
		Reverberation time [s] without acoustic measures	1690 / (6*147) = 1,69		
		Reverberation time [s] with acoustic measures	1690 / (6*356) = 0,79		
		Reverberation time [s] with 40 persons	1690 / (6*(356+20)) = 0,75		
Conclusion: the reverberation time is below 0,8. This means it meets the requirements of a yoga space.					

REVERBERATION TIME
LONG SHELL ROOF

REVERBERATION TIME
DOUBLE SHELL ROOF

CLIMATE REVERBERATION TIMES

Hallway + Presentation Space	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Concrete	143,96	0,05	7,198
	Ceiling + beams	Wood	434,20	0,10	43,42
	Columns + beams	Steel	52,40	0,05	2,62
	Back side	Existing plaster	44,00	0,10	4,40
	Left side	Existing plaster	46,50	0,10	4,65
	Right side	Existing plaster	46,50	0,10	4,65
	Toilet wall	Treated wood	12,00	0,05	0,60
	Windows	Glass	13,30	0,05	0,67
	Doors	Wood	20,00	0,10	2,00
	Curtains	Kvadrat textile	55,20	0,60	33,12
	Stairs	Wood	48,00	0,10	4,80
	Glass railings	Glass	9,20	0,05	0,46
	Stairs doors	Cork	14,00	0,50	7,00
	Train seats	Kvadrat textile	28,00	0,60	16,80
	36 Chairs	Wood and textile	21,60	0,40	8,64
	Carpet	Wool on felt	85,00	0,60	51,00
	Acoustic measures	Acoustic BAUX panels	40,00	0,80	32,00
Total Surface Area			1114		224
Average Absorption Coefficient [-]			224 / 1114 = 0,20		
Volume [m3]			777		
Reverberation time [s] without acoustic measures			777 / (6*192) = 0,67		
Reverberation time [s] with acoustic measures			777 / (6*224) = 0,58		
Conclusion: the reverberation time is below 0,6. This means it meets the requirements of a meeting room.					

Kitchen + Bar	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Concrete	166,50	0,05	8,325
	Ceiling + beams	Wood	367,40	0,10	36,74
	Columns + beams	Steel	52,40	0,05	2,62
	Back side	Existing plaster	44,00	0,10	4,40
	Left side	Existing plaster	38,00	0,10	3,80
	Right side	Existing plaster	26,00	0,10	2,60
	Toilet walls	Painted wood	24,00	0,05	1,20
	Windows	Glass	7,98	0,05	0,40
	Curtains	Kvadrat textile	12,60	0,60	7,56
	Kitchen units + Bar	Painted wood	69,60	0,05	3,48
	16 Chairs	Wood & textile	16,06	0,20	3,21
	Carpet	Wool on felt	45,00	0,60	27,00
Total Surface Area			870		101
Average Absorption Coefficient [-]			101 / 870 = 0,12		
Volume [m3]			583		
Reverberation time [s]			583 / (6*101) = 0,96		
Conclusion: the reverberation time is below 1,0. This means it meets the requirements of a cafe/bar.					

Total surface area	224 + 101 = 325
Volume total	777 + 583 = 1360
Reverberation time	1360 / (6*325) = 0,69
Reverberation time with 30 persons [s]	1360 / (6*(325+15)) = 0,66
Conclusion: the total reverberation time is below 0,7. This means it meets the general requirements.	

REVERBERATION TIME SHED ROOF GROUND FLOOR

Hallway + Presentation Space	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Wood	362,00	0,05	18,1
	Ceiling	Wood	550,00	0,10	55,00
	Roof construction	Wood	362,80	0,10	36,28
	Columns + beams	Steel	69,87	0,05	3,49
	Back side	Existing plaster	75,28	0,10	7,53
	Front side	Existing plaster	75,28	0,10	7,53
	Left side	Existing plaster	104,71	0,10	10,47
	Right side	Existing plaster	104,71	0,10	10,47
	Windows	Glass	27,31	0,05	1,37
	Doors	Painted wood	4,80	0,05	0,24
	Curtains	Kvadrat textile	49,50	0,60	29,70
	Glass railings	Glass	23,16	0,05	1,16
	Tables + dressers	Wood	55,76	0,10	5,58
	42 Chairs	Wood and textile	56,11	0,40	22,44
	Lounge	Kvadrat textile	44,00	0,60	26,40
	Carpet	Wool on felt	32,40	0,60	19,44
	Dividers	Wood	20,00	0,10	2,00
Total Surface Area			2018		257
Average Absorption Coefficient [-]			257 / 2081 = 0,13		
Volume [m3]			2508		
Reverberation time [s]			2508 / (6*257) = 1,63		
Reverberation time [s] with 40 persons			2508 / (6*(257+20)) = 1,51		
Conclusion: the reverberation time is way too high. Replacing the complete floor for a thick carpet is for example not enough, it will lead to a reverberation time of 0,92, real acoustic measures need to be taken to get below 0,7 s.					

Hallway + Presentation Space	Element	Material	Surface Area [m2]	Absorption Coefficient [-]	Absorption Surface Area [m2]
	Floor	Wood	362,00	0,05	18,1
	Ceiling	Acoustic BAUX panels	550,00	0,80	440,00
	Roof construction	Wood	362,80	0,10	36,28
	Columns + beams	Steel	69,87	0,05	3,49
	Back side	Existing plaster	75,28	0,10	7,53
	Front side	Existing plaster	75,28	0,10	7,53
	Left side	Existing plaster	104,71	0,10	10,47
	Right side	Existing plaster	104,71	0,10	10,47
	Windows	Glass	27,31	0,05	1,37
	Doors	Painted wood	4,80	0,05	0,24
	Curtains	Kvadrat textile	49,50	0,60	29,70
	Glass railings	Glass	23,16	0,05	1,16
	Tables + dressers	Wood	55,76	0,10	5,58
	42 Chairs	Wood and textile	56,11	0,40	22,44
	Lounge	Kvadrat textile	44,00	0,60	26,40
	Carpet	Wool on felt	32,40	0,60	19,44
	Acoustic dividers	Acoustic BAUX panels	20,00	0,80	16,00
Total Surface Area			2018		656
Average Absorption Coefficient [-]			656 / 2018 = 0,33		
Volume [m3]			2508		
Reverberation time [s] without acoustic measures			2508 / (6*257) = 1,77		
Reverberation time [s] with acoustic measures			2508 / (6*656) = 0,64		
Reverberation time [s] with 40 persons			2508 / (6*(656+20)) = 0,62		
Conclusion: the reverberation time is below 0,7. This means it meets the requirements of a restaurant.					

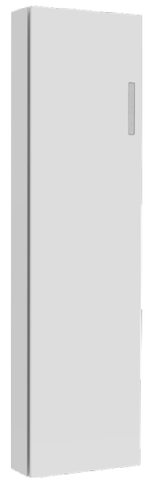
REVERBERATION TIME SHED ROOF IST FLOOR

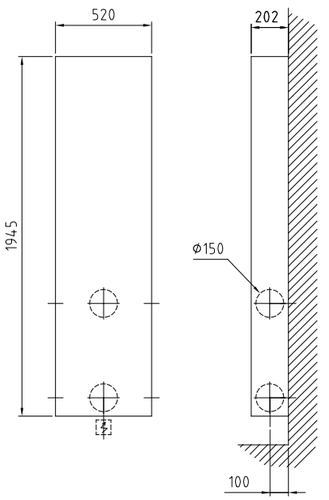
CLIMATE VENTILATION CALCULATIONS

Ruimte	**oppervlakte** (m2)	**hoogte** (m)	**volume** (m3)	**ventilatievoud** (n)	**Luchtverversing** (m3 pp)	**max personen**	**verse lucht** (m3/uur)	**verse lucht** (m3/s)	**snelheid lucht** (m/s)	**oppervlakte luchtkanaal** (m2)	**Max. diameter** (cirkel)	
Mindfull Workshops												
Workshop space	260	7	1820	1,10	50	40	2000	0,56	4	0,14	0,42	
Private space	13	7	91	0,66	30	2	60	0,02	4	0,00	0,07	
Toilets	6,25	7	43,75	2,74	30	4	120	0,03	4	0,01	0,10	
Sleeping Spaces												
Bedrooms left down	74	2,5	185	1,30	30	8	240	0,07	4	0,02	0,15	
Bedrooms left up	36	3,2	115,2	1,04	30	4	120	0,03	4	0,01	0,10	0,25
Bedrooms middle down	74	2,5	185	0,65	30	4	120	0,03	4	0,01	0,10	
Bedrooms middle up	36	3,2	115,2	1,04	30	4	120	0,03	4	0,01	0,10	0,21
Bedrooms right down	74	2,5	185	1,30	30	8	240	0,07	4	0,02	0,15	
Bedrooms right up	36	3,2	115,2	1,04	30	4	120	0,03	4	0,01	0,10	0,25
Restaurant												
Kitchen	121,5	3,5	425,25	1,41	25	24	600	0,17	4	0,04	0,23	0,12
Toilets	15,6	3,5	54,6	2,75	25	6	150	0,04	4	0,01	0,12	
Hallway + presentation space	281	3,5	983,5	1,22	25	48	1200	0,33	4	0,08	0,33	0,16
Restaurant & Exhibition	418	6	2508	0,48	25	48	1200	0,33	4	0,08	0,33	0,16

Climate installations:

• Sleeping spaces	3x Ukunda CFD 127
• Farm	4x upstairs and 6x downstairs ClimaRad Ventura V1X Per toilet 1x Climarad fan
• Workshops	-





UKUNDA CFD - Voor montage boven het plafond

Naast de compacte UKUNDA VBC/VTC serie bestaat er ook een variant voor montage boven het plafond: de UKUNDA CFD. De decentrale unit wordt aangesloten op het kanaal; de toevoerlucht kan worden ingeblazen door middel van toevoerrroosters.

De geringe inbouwhoogte maakt de unit zeer geschikt voor projecten met beperkte ruimte boven het verlaagd plafond of voor renovatieprojecten.

Verschillende uitvoeringen

De UKUNDA CFD balansventilatieunits bestaat uit drie bouwgrootten:

Model	Luchthoeveelheid [m³/h]	Externe statische druk [Pa]	Warmteterugwinning	Voltage/fase/frequentie	Vermogen [kW]	Geluidsdrukniveau [dBA] *	Gewicht [Kg]
UKUNDA CFD 47	350	100	94%	230/1/50	0.20	30	170
UKUNDA CFD 77	730	150	94%	230/1/50	0.32	31	201
UKUNDA CFD 127	950	150	93%	230/1/50	0.74	39	310

* Geluidsdrukniveau op 1.5 m, gemeten onder de unit

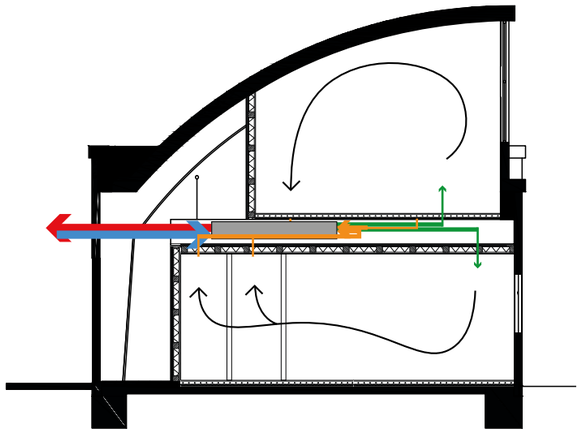
Afmetingen

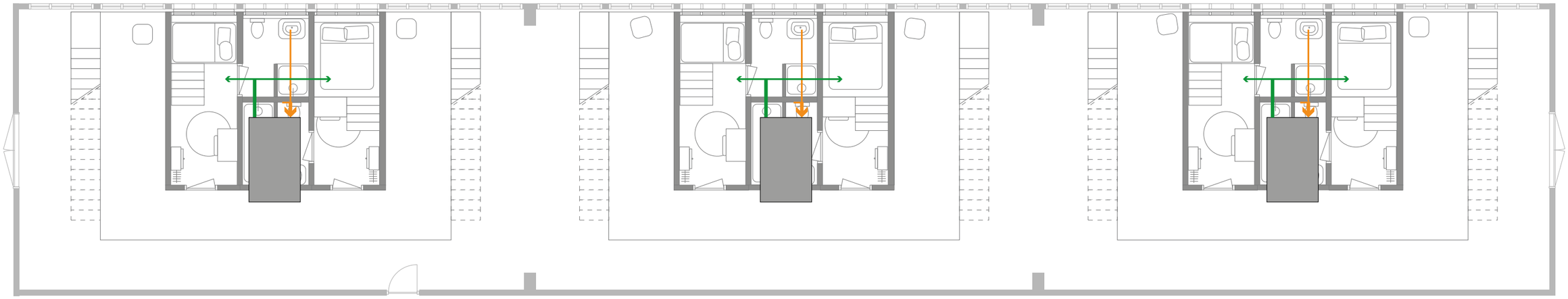
Model	L1 [mm]	L2 [mm]	W [mm]	H [mm]	D1 [mm]	D2 [mm]
UKUNDA CFD 47	1550	1000	1550	250	200	160
UKUNDA CFD 77	1550	1000	1850	250	200	160
UKUNDA CFD 127	1700	1000	1850	350	250	200

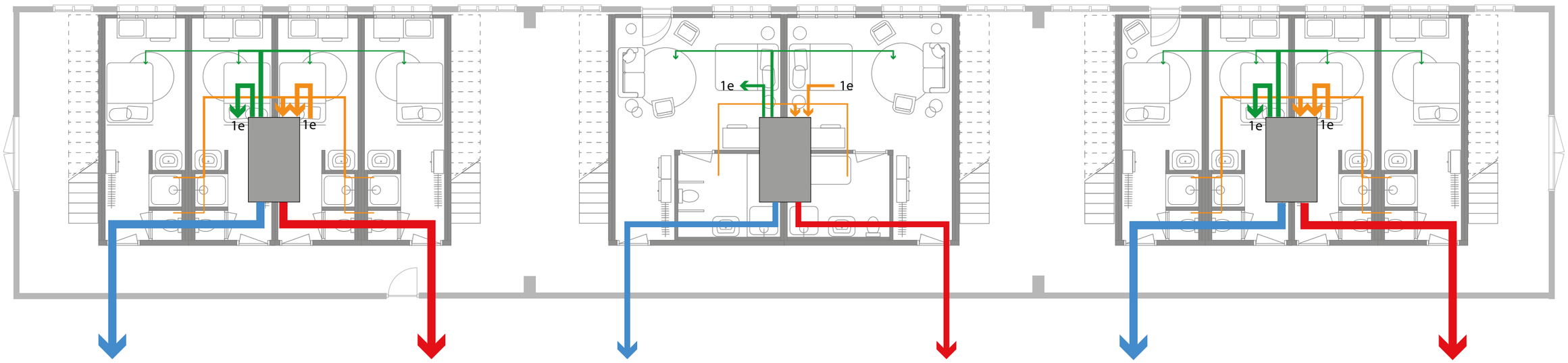
ClimaRad Ventura V1X

Afmetingen:	520x1945x202 mm (bxhxd)
Aansluitingen:	2x Ø 150 mm
Ventilatiedebiet (nom.):	160 m³/h
Ventilatiedebiet (max.):	300 m³/h
Sensoren:	CO_2 (vraaggestuurd), RV, RF, Tbi, Tbui, druksensoren
Aangesloten vermogen:	183 W (230 VAC/50Hz)
Elektrische beschermingsklasse:	Klasse II (dubbel geïsoleerd)
Specifiek ingangsvermogen (SPI):	0,1 W/(m³/h)
Standby verbruik:	< 1 W
Warmtewisselaar:	Tegenstroom tot 90% rendement
Kleppen:	Automatisch sluitende kleppen voor toe- en afvoer
Toepassing in hoogbouw:	Tot 80 m
Luchtfilters:	G4 tot F7
Energielabel:	A+
Gewicht:	50 kg

CLIMATE VENTILATION CALCULATIONS 'DE ASSEMBLAGE'







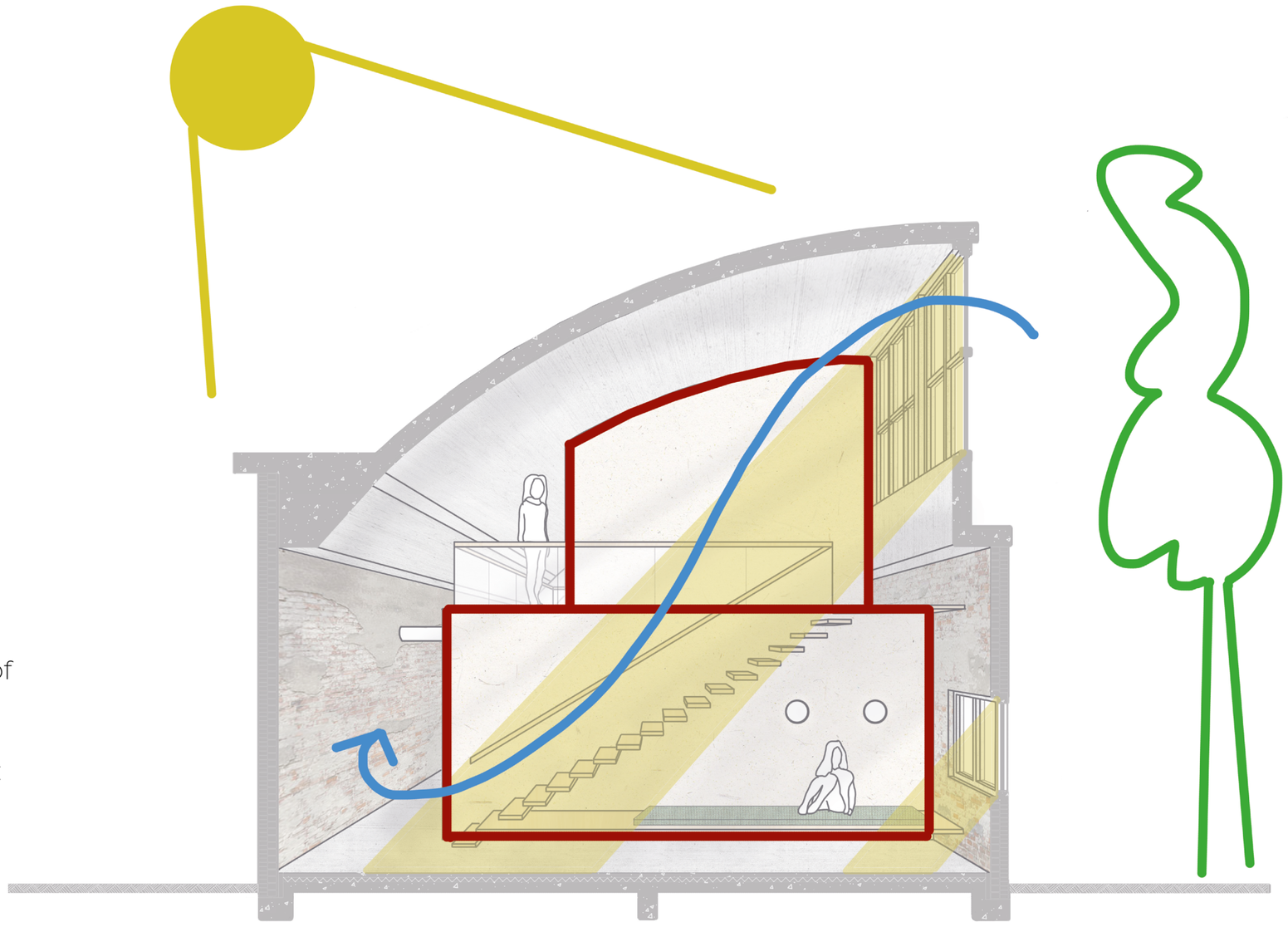
CLIMATE DE ASSEMBLAGE: CORRIDOR

Ventilation:
Natural ventilation

Shading:
Not needed

Reverberation time
without people:
Corridor <1 s: 0,86 s
Due to the **acoustic plaster** on the walls of the bedrooms

Rainwater collection:
Existing



Temperature winter:
Corridor: 12 - 16 °C
Temperature summer:
Corridor: <26 °C

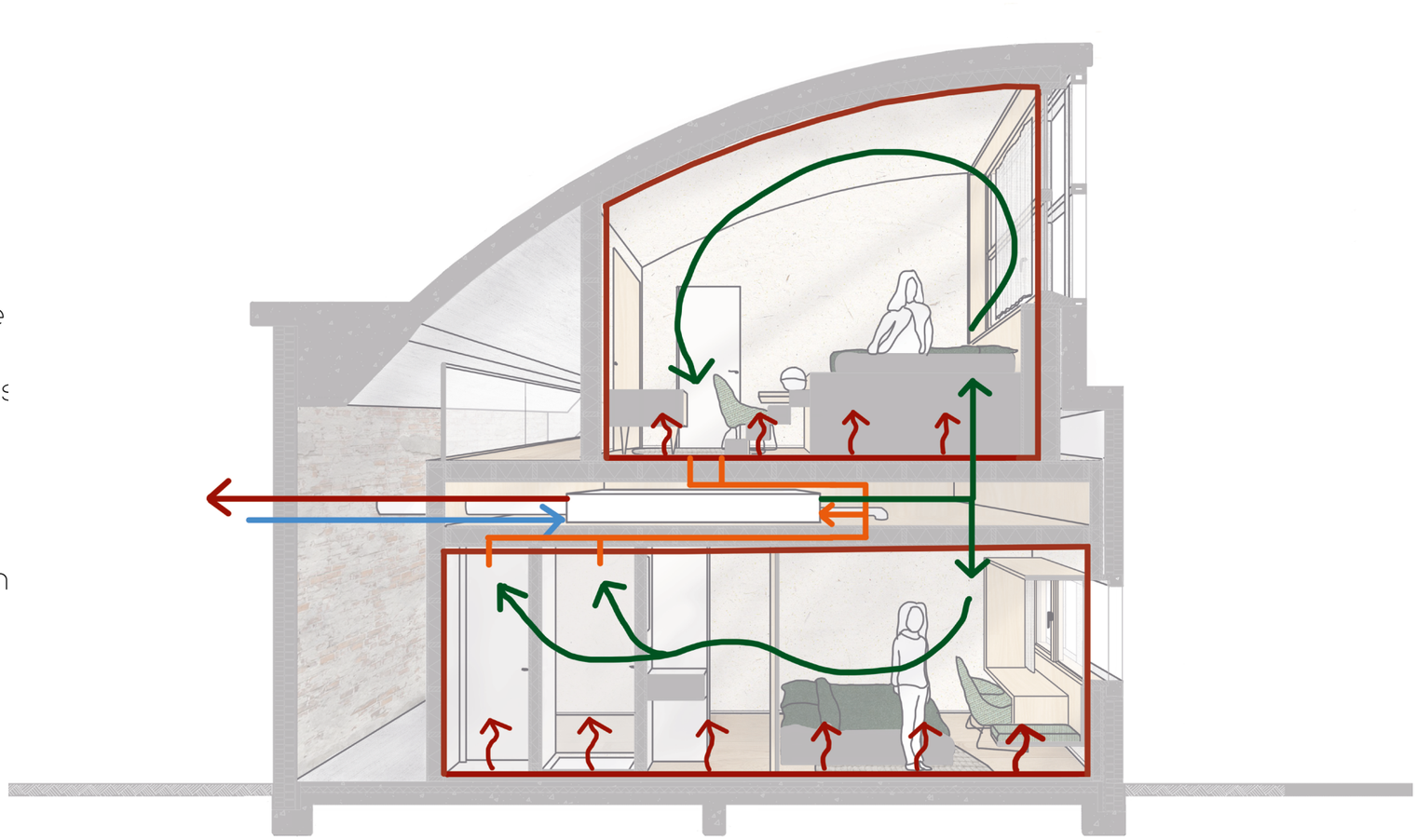
Treated as outside:
unheated, but the bedrooms will heat the space partly by giving off their warmth.
In summer cooled by natural ventilation and open the doors on both sides

CLIMATE DE ASSEMBLAGE: WINTER

Shading:
Not needed

Reverberation time
without people:
Rooms <0,5 s: 0,44 s
Due to the loam
plaster walls

Rainwater collection
Existing



Temperature winter:
Rooms: 18 - 22 °C

Heating by JK Fermafloor dry floor heating system.
And heat recycling by
decentral ventilation unit.

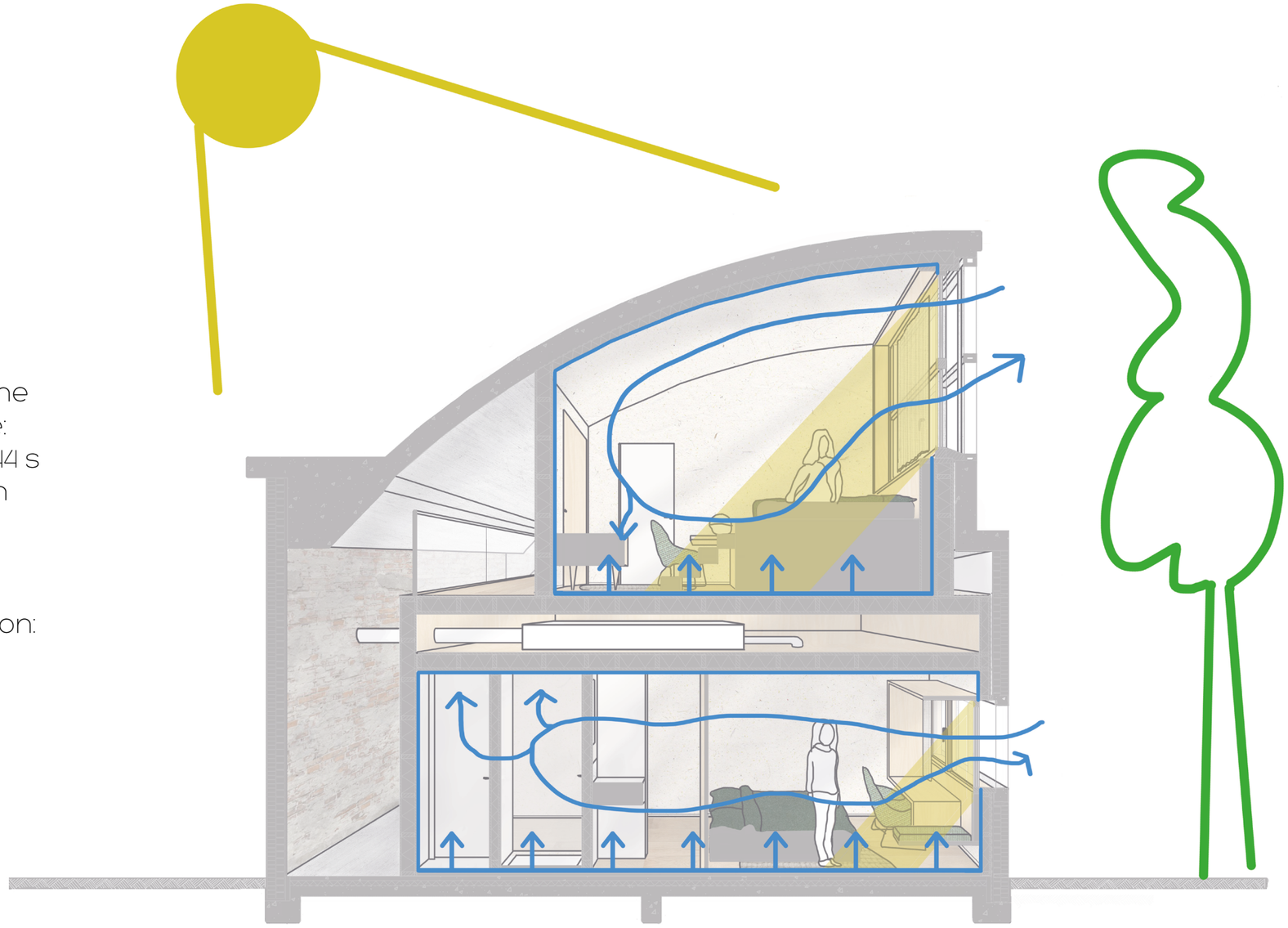
Ventilation:
Ventilated per block of 6 rooms. max 12 persons,
is 360 m3/h needed:
decentral ventilation
unit Ukunda 77.

CLIMATE DE ASSEMBLAGE: SUMMER

Shading:
Not needed

Reverberation time
without people:
Rooms <0,5 s: 0,44 s
Due to the loam
plaster walls

Rainwater collection:
Existing



Temperature summer:
Rooms: <24 °C

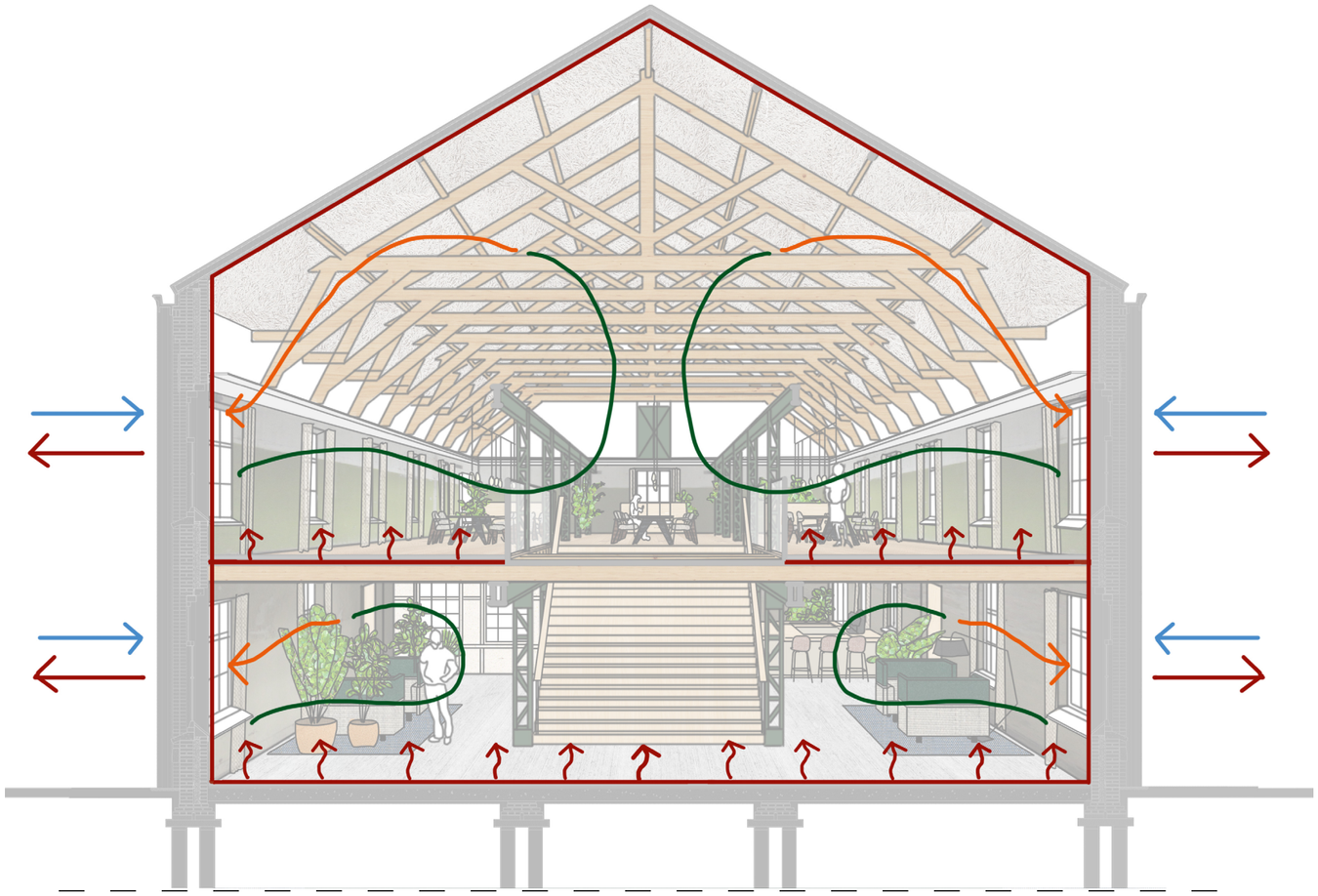
Cooling by decentral
ventilation unit, natural
ventilation. and floor

Ventilation:
Natural ventilation. If needed extra help
from the decentral
ventilation unit

Shading:
Not needed

Reverberation time
without people:
GF <0,7 s: 0,66 s
1st <0,7 s: 0,64 s
Due to the acoustic
BAUX panels, acoustic
ceiling and carpets.

Rainwater collection:
Existing



Temperature winter:
Being together: 18 - 22 °C

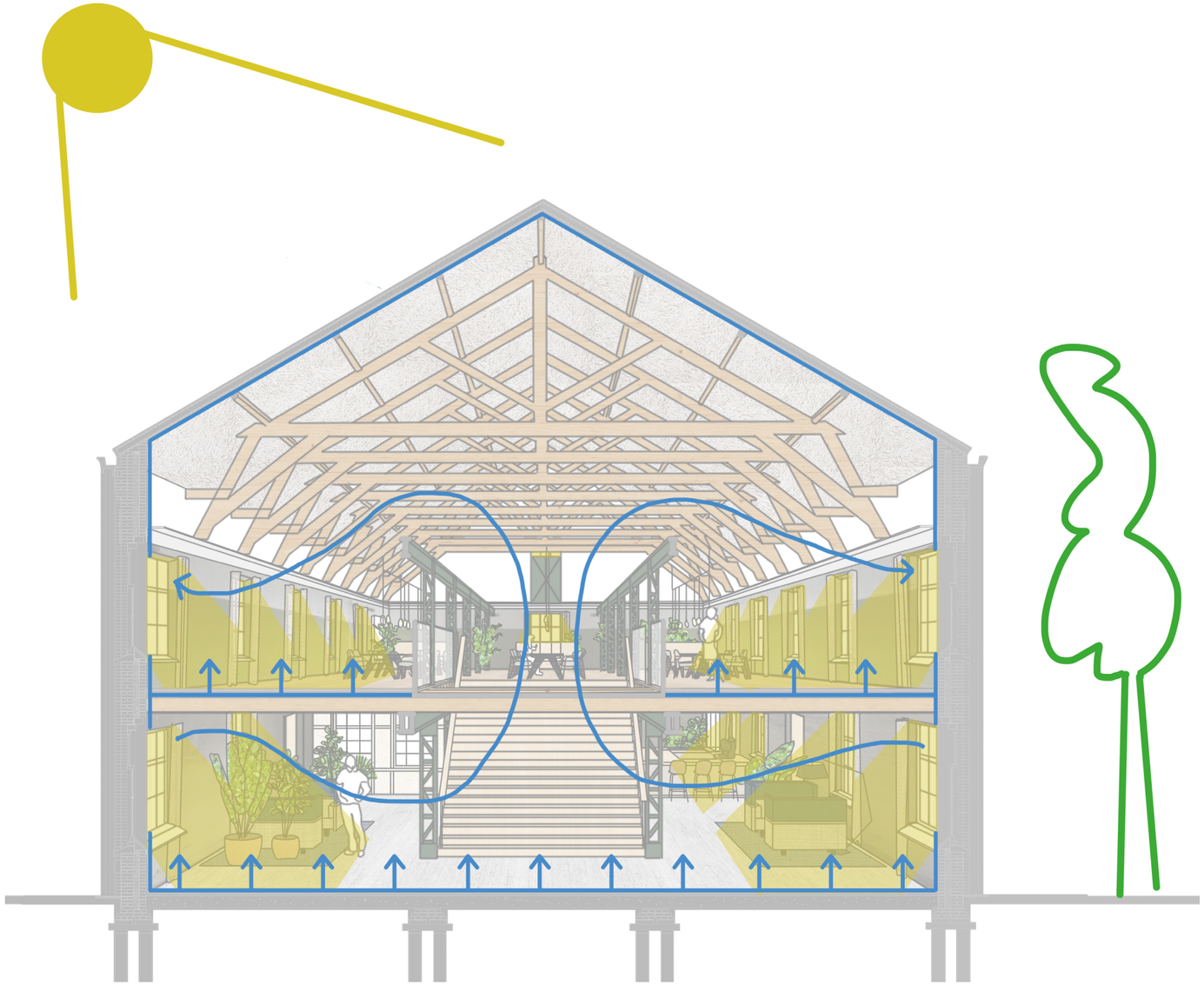
Heating by JK Fermafloor
dry floor heating system.
And heat recycling by
decentral ventilation unit

Ventilation:
Decentral ventilation unit:
ClimaRad Ventura V1X
GF: 1600 m3/h needed:
6 times
1st: 1000 m3/h needed:
4 times

Shading:
Not needed

Reverberation time
without people:
GF <0,7 s: 0,66 s
1st <0,7 s: 0,64 s
Due to the acoustic
BAUX panels, acoustic
ceiling and carpets.

Rainwater collection:
Existing



Temperature summer:
Being together: <26 °C

Cooling by decentral
ventilation unit, natural
ventilation and the floor

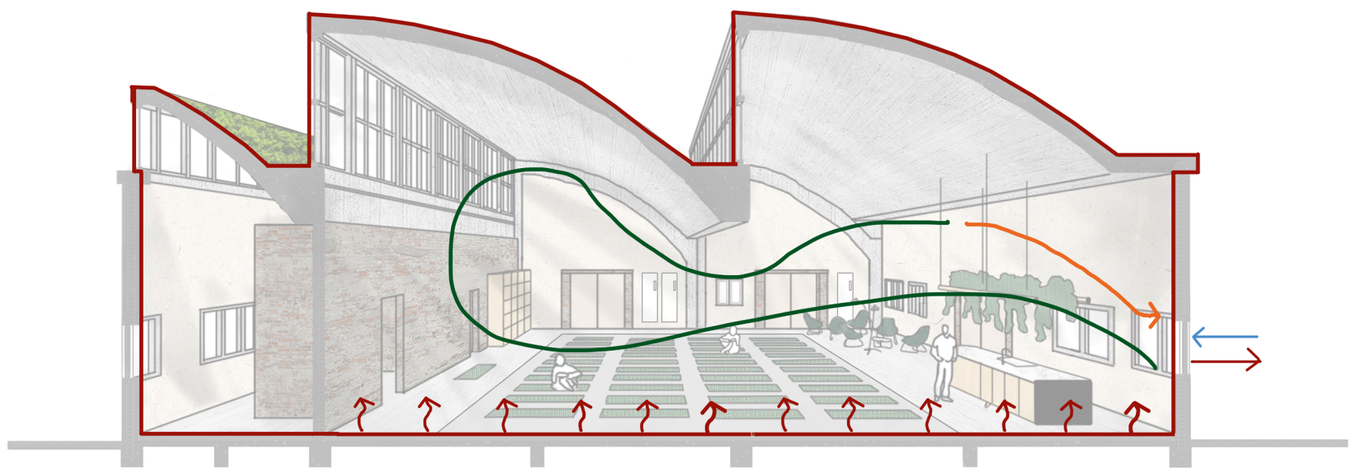
Ventilation:
Natural ventilation. If needed extra help from the decentral ventilation unit

CLIMATE DE PERSERIJ: WINTER

Shading:
Not needed

Reverberation time
without people:
Workshop <0,7 s: 0,66 s
Due to the **acoustic BAUX panels on the walls and eco PVC floor**.

Rainwater collection:
Existing

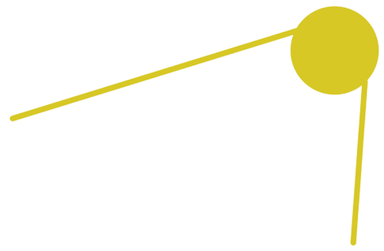


Temperature winter:
Workshop 16 - 18 °C
Heating by JK Fermafloor dry floor heating system.
And heat recycling by
decentral ventilation unit

Ventilation:
Decentral ventilation unit:
ClimaRad Ventura V1X
1600 m3/h needed:
6 times

CLIMATE DE PERSERIJ: SUMMER

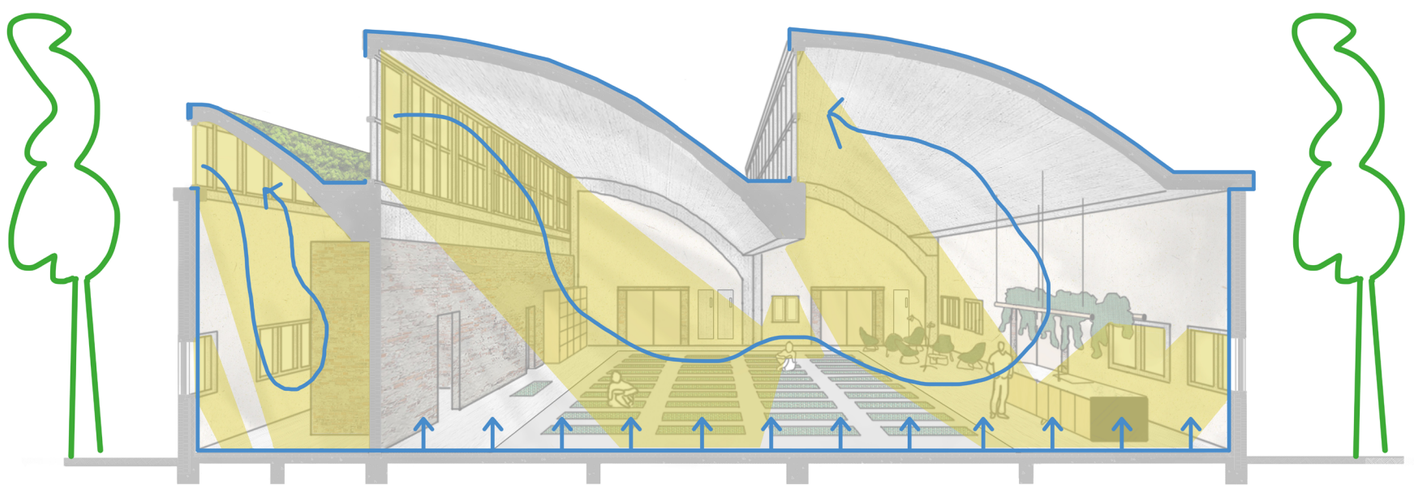
Shading:
Not needed



Temperature summer:
Workshop <26 °C

Reverberation time without people:
Workshop <0,7 s: 0,66 s
Due to the acoustic BAUX panels on the walls and eco PVC floor.

Rainwater collection:
Existing



Cooling by decentral ventilation unit, natural ventilation and floor

Ventilation:
Natural ventilation. If needed extra help from the decentral ventilation unit